



3 2044 107 266 777

Tas

B

57

Library
Arnold Arboretum



of
Harvard University

141
2



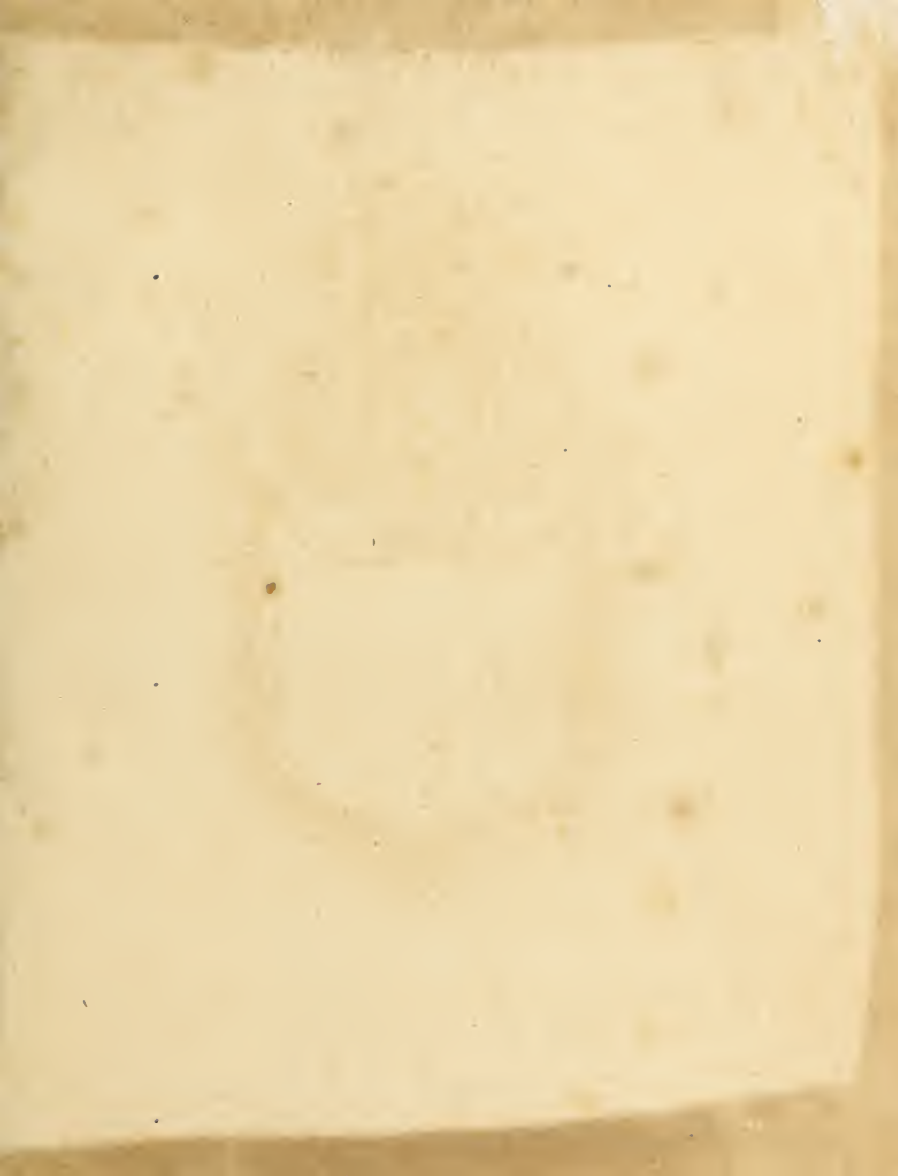
Samuelis Eliot,
Bostoniensis.
1823.

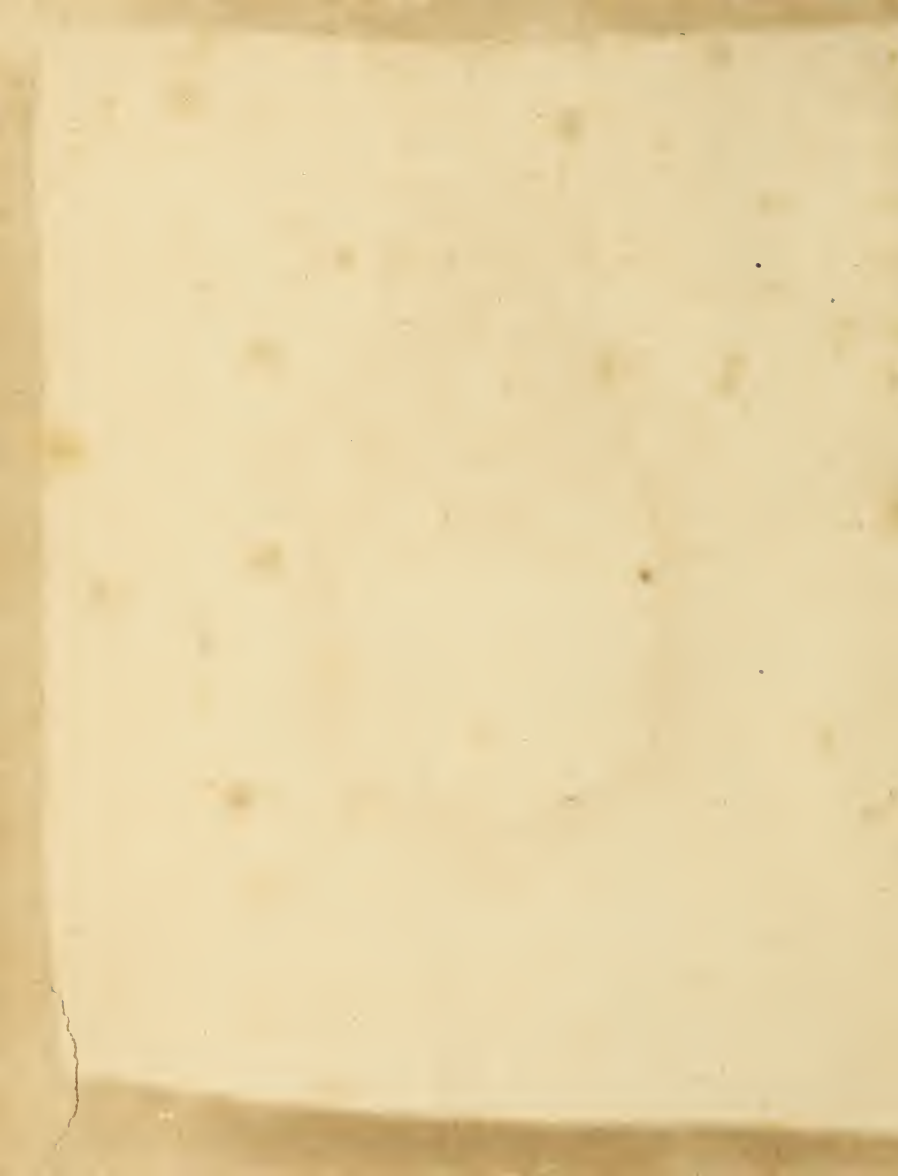
trans
from Dm

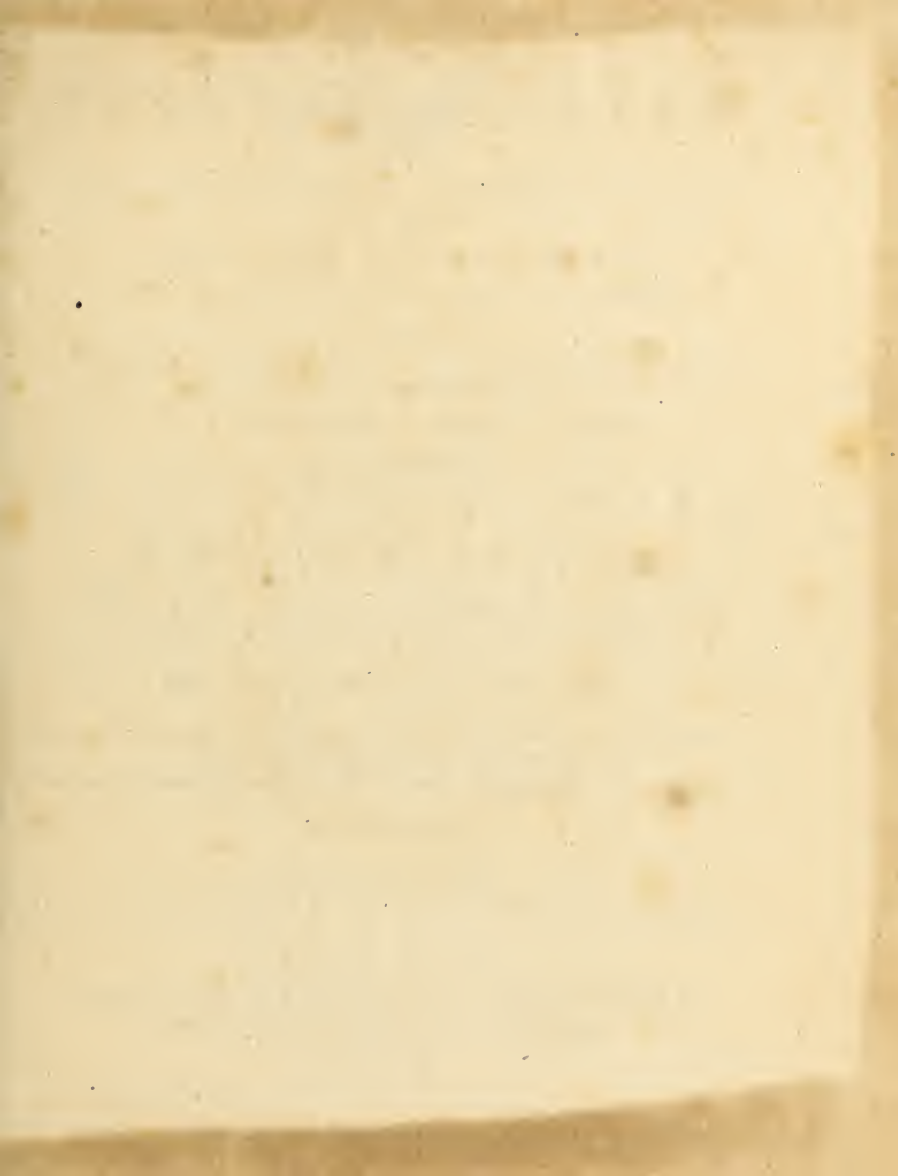


Digitized by the Internet Archive
in 2017 with funding from
BHL-SIL-FEDLINK

<https://archive.org/details/vegetablesystemo01hill>







50,301

Oct 14, 1978

Trans from
Cott. Hut

T H E
VEGETABLE SYSTEM.

O R,

The INTERNAL STRUCTURE,

A N D

The LIFE O F P L A N T S;

Their P A R T S and N O U R I S H M E N T explained;

T H E I R

C L A S S E S, O R D E R S, G E N E R A, and S P E C I E S.

A s c e r t a i n e d and D e s c r i b e d,

I n a M E T H O D altogether N E W.

C O M P R E H E N D I N G,

A N A R T I F I C I A L I N D E X,

A N D

A N A T U R A L S Y S T E M.

With F I G U R E S of all the P L A N T S;

D e s i g n e d and E n g r a v e d by the A U T H O R.

The W H O L E from N A T U R E only.

By J O H N H I L L, M. D.

V O L. II.

C O N T A I N I N G THE W H O L E

S E R I E S of P L A N T S with R A D I A T E D, F L O W E R S.

J^t

L O N D O N.

Printed at the E X P E N C E of the A U T H O R,

And sold by R. B A L D W I N, in P a t e r - N o s t e r - R o w.

M D C C L X I.

Bot 357.59

7 0 A 7 2 4 9

941
82

P R E F A C E.

IF care and attention demand some regard in works of Science, this may be allowed to plead at least that humbler kind of merit.

THE Reader will be pleased to know, that the Work now laid before him, has been printed and engraved more than a year ; and has been kept so long unpublished, that truth and nature might appear in it, not only correctly represented from particular objects, but confirmed, ascertained, and universal. I claim no merit from this assiduity : I owe it all, and more, (if it were possible for me to shew more,) to the auspices under which this Work was begun, and to the patronage by which it is continued.

WHEN we compare Nature with the representations even of the most respected Authors, we see such differences as ought to give us a very humble opinion of the best human judgment. I hope many of their errors will be avoided here. They wrote
often

often from the information of others : here every thing is from Nature only. The Plants themselves have furnished their own characters, not the accounts of those who had elsewhere seen them. They have been raised for this purpose in a garden where no manure has ever been admitted ; and where there are not single Plants, but intire beds of each. They have been therefore raised in a state of simple nature ; and, if any thing has appeared particular in one or two, it can have caused no error, since there were others of the kind wherewith to compare those variations.

I MAY be allowed therefore to hope the representations are to be depended on : and it will appear some advantage, that all the Plants of this extensive Class, are here shewn together ; that there is no occasion to turn to other books about them ; nor to lament the want of figures of any of them ; without which even the most accurate descriptions often convey but very imperfect ideas of the object.

EACH figure represents such a portion of the Plant as contains all its characters : a flowering branch, with a larger leaf from the body of the stem, or root : and the size is that of apparent nature : not what the parts would measure if laid
upon

upon the paper, but such as they shew themselves naturally while growing. We bring a book within six or eight inches of the eye; but we view Herbs in their native beds, at ten, or twelve feet distance.

IN general, three or four Plants only are represented on a plate; but where the species are numerous, and the distinctions could not be comprehended but by a view of several of them at once, I have been content to take smaller portions, and to reduce the usual size a little, that six or eight may stand before the eye together.

WHAT I have farther to add is, that with respect to the merit a candid Reader may allow this Work, the very smallest part of it is mine. Whatever addition may be found here, to the knowledge of vegetable nature; or whatever improvements may be deduced from the succeeding parts, in medicine, or in the arts and commerce, the Publick owe them all to one great personage, to whom they do, and I think will, owe infinitely more than these slight tributes. His attention to whatever may concern the welfare of Britain, has influenced him to countenance this study. His superior genius formed the Plan, and his munificence enables me to execute it: he
raised

raised me from low cares, that I might attend to it, with that quietness of mind which is required for works of Science : he supports the garden where the Plants are raised ; and he directs how the study of them may be made most useful. I am but as the hand which executes these great designs. It is sufficient glory for me to have been chosen for that purpose ; nor can I wish a greater happiness than to be thus made instrumental to the good of mankind.

Bays-water,
Oct. 4, 1761.

INTRODUCTION.

WE have seen how Plants are formed ; and we may now proceed to enquire into the Manner wherein they are nourished : the Structure and the true Course of their juices being known, it remains only that we examine what those Juices originally are, whence they are deduced, and by what Powers they are conveyed into the Vegetable Organs.

These Resources and these Powers are to be sought among the Elements.

This Enquiry will shew the Dependance and Analogy there is between the vast constituent Parts of this our System, and those lesser Objects which are their Productions ; It will give us the just Connection between natural Philosophy and natural History, and shew that there is no Part of the Creation disjoined from the rest, but all connected and dependent ; the whole one vast, unbroken, and uninterrupted Chain, the imagined Divisions of which have no Foundation but in our imperfect Knowledge.

From this general view of the Vegetable World, we shall be led regularly to the distinct Forms and Situations of the several Parts of Plants ; on which the greater and
lesse

INTRODUCTION.

leſſer Arrangements of Claſs, Order, Genus, and Species are eſtabliſhed ; and theſe being explained in familiar Words, and aſcertained by an exact Representation of their Forms, we may proceed with Certainty to the Diſtinctions of the Plants themſelves ; their Hiſtory and their Figures.



BOOK I.

ON THE

E F F E C T S

OF THE

E L E M E N T S A N D S E A S O N S

U P O N

VEGETABLE BODIES.

C H A P. I.

The EFFECTS of HEAT, or FIRE, ON VEGETABLES.

HEAT is necessary in some degree to all Plants ; and in various proportions to the different kinds : but it is the same from whatsoever source they receive it. The Plant will thrive if the air have a due warmth, whether that be occasioned by the sun, or a common fire. 'Tis hence our stoves support the Vegetables of the hottest climates.

THOSE which are natives of colder regions require less Heat ; but some portion of this actuating Element is of absolute necessity to all : without it the Juices would be frozen ; and vegetative Life would cease. 'Tis therefore Heat has been called, in the modern metaphoric language, the HEART of Plants : it keeps the Juices fluid, and by the expansion and contraction of the parts, according to its various degrees, is the great cause that puts them first in motion. Therefore the more warmth there is in any place, the finer Plants

should be produced there; and we see this in fact: the hottest countries affording in general the tallest trees, the largest flowers, and the finest fruits.

THE power of Heat is so great on plants, that an excess or deficiency of it in any considerable degree, is equally fatal. That which was natural to them in their own soil supports them also in our stoves: but more or less changes their time of duration, and equally destroys them, though by different means.

PERENNIAL Plants of somewhat warmer climates become annual in those a little colder. The earth wants Heat in Winter to keep up the primary circulation which is in the Flesh of the root; and it decays: but Seeds being ripened first, the Vegetable may be raised in Spring and live the Summer. Many of those whose woody Stems naturally remain throughout the year, when they are brought where there is less Heat, lose them in Winter; but the Root, being hardy, lives. Thus weak Shrubs of warmer climates are reduced to the condition of perennial Plants in those which are somewhat colder; and perennial Plants to annual. This change is in many instances reciprocal: Plants which are annual here, living through Winter, in more southern countries; and those which lose their Stalks retaining them there throughout all Seasons.

THAT Heat is thus essential to Vegetation, and thus appropriated in the degree to Plants, according to their native place, we see by the effects of an inconsiderate increase or diminution. The more Heat a Plant receives the thinner are its Juices, the swifter they move, and the faster it grows: therefore if we give any Species much more than its natural proportion it becomes luxuriant; but nature will not be forced thus with safety: it fades soon after; and perishes inevitably. On the contrary, if we allow less than the natural Heat, in any important degree, the Plant, though it continues to live, ceases growing; it produces no Flowers or Fruit; and if the warmth be still something more decreased, it loses the Leaves, and dies absolutely.

THUS

THUS we see a great deal is owing to Heat: but it is not so much as has been thought: for the same climates, countries in remote parts of the earth where the degree of Heat is alike, do not produce the same Plants; but often the most different. ROME and PEKIN are nearly in the same latitude, but what can be more different than the ITALIAN and CHINESE Plants? The CAPE of GOOD HOPE may be matched in latitude by different places; but no where in its Vegetables: they are peculiar, and distinct from those of all the world; and are perhaps more beautiful. In these places the heat is nearly equal, but the Plants are different; the air has the same warmth, but Vegetation takes quite another course. Therefore we are to seek the variation in some other cause; and naturally in the other Elements.

C H A P. II.

Of the EFFECTS of AIR in VEGETATION.

AIR is not less necessary to Plants than Fire. When shut up from it entirely, they die equally; or when it is withdrawn from them in less degrees, they fade in proportion. Seeds will not grow in the receiver of an air pump, when carefully exhausted; and vigorous young plants die.

VEGETABLES will live in the same quantity of confined Air much longer than animals; for they fill it less by their cool perspiration, but it is only for a certain time they will bear it. If a Sprig of Mint be set in water in a bottle open, and a like one in a bottle corked, they will for many days grow with equal vigour; but afterwards the Plant that is corked up will begin to fade: its Juices stagnate, mouldyness appears upon its extreme parts, and it dies. Therefore not only Air, but a free Air is necessary to Plants; and Vegetation is affected by all its changes, and its natural differences.

THE thinnest Air is on the tops of mountains ; and its effects on Vegetation are uniform and constant there. We have seen the Plants of different places under equal latitudes vary greatly in stature and in species, though the Heat be the same : perhaps, nay probably, the difference of Air makes the change ; for where that is alike, Vegetation is alike also. The high mountains of all parts of the world afford the same aspect in their Vegetables : all are low but hardy : we see the Shrubs of the same humble height on MOUNT OLYMPUS and the Hills of GREENLAND ; the ALPS and PYRENEANS, the Mountains of the BRASILS and of LAPLAND yield the same crops of vegetable nature ; nay, there is no difference between the productions of our own WELSH Mountains, and of ARARAT. Not only Plants of the same heights but the same Plants, the same Species, are found on all these mountains, though they are so remote, and under such different latitudes. Heat cannot do this, for there are no Plants common to all hot countries ; and Cold is but a negative quality ; the want of Heat, and nothing more. The Soil is different on these various mountains ; so it is not that which occasions this amazing regularity and sameness in their productions. It is therefore in the Air we are to seek the cause : and we may learn from this single instance its great qualities in regard to Vegetation. Air is of absolute necessity to vegetable life, and makes a part of the bodies of all Plants ; as is constantly found in their analysis : but it is not pure Air that raises them to height, or gives their spacious Flowers : Air loaded with moist vapours, and actuated by considerable Heat, feeds the vegetable faculties most freely.

C H A P. III.

Of the EFFECTS of EARTH in VEGETATION.

EARTH is the food of Plants ; and constitutes their substance : from this they arise, and to this they return. Water will support some kinds, but 'tis by means of the Earth which it contains : and Earth owes to water the power of entering the vessels in
all

all Vegetables. The Plants which grow in sun-burnt deserts and parched sands are no objection; for they are supplied from the air, as Sea-plants from the water; imbibing nourishment at their whole surface.

As the Earth wherein Plants grow is more or less soluble in water, they flourish more or less; and there is some difference also in the state of it. Pure black mould is of all Earths the most soluble, therefore Plants grow largest in this. The mould of garden-borders is an instance: and in wild nature the Burdock, Thistles, and Hemlock shew themselves upon this Soil in all their lofty stature: on the contrary, Clay, which dissolves more difficultly, affords the low Knotgrasses, Swines-cress, and some of the hardier Trefails. Chalk offers certain species somewhat larger, as it is something more dissoluble; the Kidney-vetch, the Reseda, and the Campanulas. Sand has its place in the enquiries of an excellent guide, LINNÆUS, on this head; but certainly without just reason. Sand is a debased Crystal: this cannot be broke or dissolved at all by the water; it is not Earth, nor can it nourish Plants. Those which are found on sandy soils are fed only by the loose Earth which happens to be among the Sand: therefore they are less constant in their nature. Where sands are very poor, we see the low Plants, Rupture-wort and starved Serpyllum; when there is more Earth among them we see Grasses or Reeds, or shrubby Heath or the tall Fox-glove. There is no certain character of the Plants of sandy Sods, because they depend upon the kind and quantity of real Earth which is among the Sand.

EARTH of a less proper kind may feed Plants luxuriantly when art or accident have rendered it more soluble in water: it is hence that the field-culture makes Vegetables large: and hence ditch-banks of Clay, after they have been raised a time, feed the tall Navew: what the implements of husbandry effect in the first case the air does in the other; breaking and mellowing the soil, and rendering it easier to be dissolved by water. It is thus manures act also: they raise a fermentation which divides the Earth; and it becomes fit for giving nourishment to Plants; for many of those ingredients which effect this change in Earth will not feed plants alone: salt,

sea-weed, foot, and rags, and many more are instances: all of which yet in a certain proportion, ferment and break tough Earths, and render them more fit for Vegetation.

No Plant can grow without Earth, for that must make its substance: such Earth as water can dissolve most easily, answers this purpose best; and others in proportion as art and industry bring them nearer to this state. We are not to suppose Plants feed on any thing else: those which live in water are certainly fed by the Earth contained in that water; those upon rocks, by dust blown into their crevices and washed down by rains; those upon walls, by the mould among the mortar; and even those on dunghills, by the Earth mixed among the mafs; for absolute dung will not support any Plant beyond a little fungus.

C H A P. IV.

Of the EFFECTS of WATER in VEGETATION.

HEAT itself is not more immediately necessary to Vegetation than Water. Tho' earth is the food of Plants; it is Water which conveys this to their several parts. This enters the Roots, carrying with it a certain quantity of the earth, which it leaves behind in the Plant to encrease its solid substance, itself evaporating through the leaves. Dry earth, in ever so small particles, could not be received into the vessels; nor if received, could it pass through them. There is necessity of a Fluid to give it entrance and conveyance; and the Fluid nature furnishes is Water. Rains give this to the earth, and it is detained at a small depth beneath the surface, where the Roots run: the air also abounds with it: so that the Plant is supplied by day, one of these ways, and during night the other; and cannot but receive it.

A CERTAIN proportion of Moisture is also necessary, for the health of the Plant, to be retained always within its Vessels. This Moisture is not pure Water, for it is the Juice of the Herb; but it was Water first, and as it wastes must be supplied by Water. The sun
exhales

exhales it all day long, and the Plant fades under his influence only for that reason : but the evening-dews restore it.

PLANTS set in mould of ever so rich a kind, if it be absolutely dry, receive no nourishment ; but fade instantly and irrecoverably. On the other hand, any Plant set in Water, and covered to keep in the Moisture it exhales, will live and grow. We think some Plants will live in water, and others not : but all will do it if the moist vapour they exhale be returned upon them. Those which live in the open air with their Stems plunged in Water perspire less, and therefore a less supply will preserve them ; those which evaporate more require to be supplied also from their Leaves imbibing a moist Atmosphere. This is all the difference.

ON Water thus evaporated, and thus received, depends in a great measure the peculiarity of certain Plants being found in climates ; and the singularity observed before, that though different countries, under various climates, produce distinct Plants, those in the same latitudes are not always the same. Not only a certain warmth in the air, but, an appropriated construction of the parts of evaporation is requisite for this purpose. Plants whose leaves have the same or a like texture are found in different countries under equal latitudes ; but those which are particular in this respect, perspiring, whether it be less or more than the usual proportion, can be found only in those places, under an equal heat, which, from the degree of Moisture in the air, afford a proportioned supply.

THUS Water is eminently concerned in that peculiarity of Plants and places, the cause of which must have been sought in vain, while the whole was attributed to heat. A proof of this is evident in those species which live under Water ; for there evaporation and absorption being small and simple, and the degree of heat tempered extremely by the depth, the same species are found in the most distant climates : thus the common yellow Water-lilly and the *Lentibularia*, with several other ENGLISH Plants, which grow under deep Waters, are found in CHINA and the INDIES ; though they have also others of the same species which are not known here.

To prove that it is the state of the Plant respective to its evaporation which occasions this, we may add to the list the common Sun-dew whose exhausted Fluid is received again, not lost: for this Plant is common also in the INDIES.

C H A P. V.

Of the EFFECTS of SEASONS upon VEGETATION.

THE power of the Elements on vegetable Bodies being ascertained, we may rationally enquire into the changes brought on by various Seasons. Summer and Winter, Spring and Autumn differ no otherwise from one another than in the proportions of heat and cold, moisture and dryness. All their distinctions rest upon the various degrees of fire, and water, and the effects these take upon the two other Elements, earth and air: and all the changes they produce in Plants, in the same manner depend upon the variations in those Elements. While too much was attributed to heat, and consequently too little to all the rest, these enquiries could not be prosecuted with any degree of certainty: but when the whole is placed before the eye together, and the Elements are considered, not only simply, but in their several combinations, perhaps this subject will be better understood.

WINTER acts only on Plants by the diminution of heat. We have seen what are the effects of this principle in its more perfect stages and degrees; and we may therefore easily understand how that Season produces changes in Plants by its deprivation. It is heat that raises the juices of Vegetables; and they in their ascent forming their own vessels, as has been shewn in the preceeding volume, the plant rises above the ground. As heat causes this, the Vegetables of equal natural strength will be tallest where there is most heat, all other things being equal. This we see in fact, for the loftiest trees grow in the hottest climates. Therefore when the degree of heat which raised our humble Plants to their proper height ceases at the close of Summer, the body cannot be supported

ed at the height to which it was carried; and it dies to the ground. The Root requires a less degree of warmth to keep it in a state of potential life; therefore the small remains of Heat that are under the surface in Winter preserve this: but in extreme frost it also decays: the Juices are reduced to ice, and the Root no more recovers. This is the effect of Winter upon the generality of our Plants. Annuals requiring more heat than perennials, perish Root and all, at the approach of the cold; and Trees by the hard matter of their trunks defend the inclosed Juices: these are not contradictions of the general law; but natural exceptions.

THE warmth of Spring begins again to rouse the stagnant Juices of perennial Roots, and call them upwards: at the same time the earth, the Plants certain food, is moistened and dissolved by the rains of that Season; therefore it is in the just condition to afford a full supply. Thus the vegetable extends, and is encreased, and grows, through this time, and the succeeding Summer; till the chill Autumn stops its progress; if it have not before been terminated by fructification. According to the stronger or weaker texture of its parts it either dies entire, as in the annual kind; or what is under ground remains, as in perennials; or its trunk and branches firm, though naked, preserve themselves through Winter, as Roots above the ground; losing only the tenderer parts, their Leaves; not always those.

C H A P. VI.

Of the RISE and FALL of the SAP.

WE have seen that it is heat which principally occasions the Rise of the Juices in vegetables: and therefore this ascent is greatest in the hottest seasons. In Plants it is only in those seasons that it takes place; but in trees whose firmness preserves them above ground, there is some rise of the Sap at all times, even in the depth of winter. Reason declares this, and what we see confirms it. The branch of a Vine which grows in the open air, near a stove, being

let into that warm place, will shoot out leaves, and bud and blossom and bear fruit even in the depth of Winter: while all the rest of the same Vine is naked. Therefore even in dead Winter Sap rises in the Vine; although it has not force to shoot out Leaves and Flowers till natural or artificial heat promote it.

THE great cause of the rise of Sap from the Root is the heat of the air: the fall, or propulsion downward is owing to the quantity of moisture received by the Leaves in the evening; which presses down the Juice in the Vessels. Part of this has been exhausted during the day, and the remainder being condensed by the night's cold does not fill those Vessels: the quantity received above occupies the vacant space, and by its mere weight forces the rest down towards the Root; till the next day's heat evaporates more from the Leaves, and raises more from the Root again: and this is the cause of every day's motion in the Sap.

THERE is no season in which there is not some heat in the air; and therefore there is no time when some Sap does not rise: the Winter Vine shews this; and there are other proofs, which naturally have their place in the succeeding Chapter. What has been called the Rise of Sap into the Trunks of Trees in Spring, and its Fall into their Roots in Winter, is in reality no more than the ascent of the Juices in a greater or less quantity, proportioned to the warmth of the air. In Autumn the Sap ceases to rise in any obvious quantity, and through Winter the same state holds: this is called the Fall of the Sap into the Root. But we see there is not only no Fall, but there is a real Rise at that time, though little: when Spring-suns warm the air, and rains give abundant moisture to the earth and atmosphere, the Juices ascend in visible and vast quantities: and this is called the Rise of the Sap in Trees. It is needful to explain the doctrine, though erroneous; for it is not in nature a Rise and Fall of these Juices, but a swifter and more abundant, or a slower and less copious ascent. Universal nature shews that there is no part of any Plant firm enough in its texture to support itself above the ground, wherein there is not, even in the coldest seasons, a Rise of Sap, though it be little in quantity; for when that ceases they perish. Vegetable bodies preserve

serve their power of growth only so long as their is vegetative life in them: and vegetable life consists in a motion of the Juices.

C H A P. VII.

Of the FALL and PERMANENCY of the LEAF.

THE Fall or fading of the Leaves at Autumn, or their retention all Winter in life and vigour on the Tree, affords a great, an obvious, and a valuable distinction: yet it is not so certain as has been supposed; nor can it be accounted for so easily. Hypotheses without proofs in nature solve all problems quickly; but the advances made by observation are slow. They have however their reward: they are eternal.

DISTINCTIONS have been established on the characters of the Evergreen and deciduous-leaved Trees: but stricter observation shews that the same Tree will in one climate drop its Leaves in Autumn, which in another holds them all the Winter. The country where the Leaves are kept thro' Winter is always warmer than that wherein the same Tree loses them in Autumn: and this leads us one step toward the general cause why some Trees lose and others hold them. Warmth gives rise to the sap, and the greater the degree of warmth is the more sap rises: but we find there are in the same climate some Trees which hold and others which drop their Leaves; though the warmth be equal. The Box and Holly are green with us all Winter; while the Sallow and Hawthorn, and the generality of others, lose their Leaves at Autumn: therefore it is evident, though the degree of heat be a part of the cause, we must seek further for the whole. Perhaps the error hitherto has been the attributing to one principle what was the result of two or more.

THE cause why Trees lose their Leaves with us at Autumn is evidently the same that makes Plants lose their Stalks and die down to the ground: and this is the want of heat to raise the Juices to them: but we have seen that some Sap rises in all Trees in Winter; and if

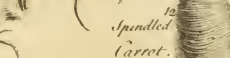
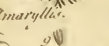
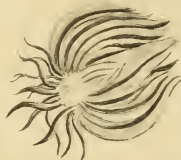
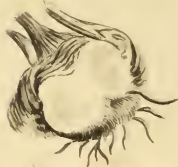
we

we would know why this quantity of Sap is enough to keep the Leaves alive in certain kinds, and not in others, we must seek it in those Juices, and their texture.

THE Juices of the Hawthorn are thin and watery; those of the Holly are thick even to a degree approaching to bird-lime: the Leaf of the Hawthorn is full of large pores for evaporation; the Leaf of Holly has few and small: this holds in all the deciduous-leaved and ever-green trees in a greater or less degree: these are selected only because it is most obvious in them. This gives the reason of the difference; and explains why in a warmer climate the same species may keep the Leaf which here lose it. Leaves fall because the supply of Juices from the Root is not equal to the waste by evaporation: and therefore those which perspire or evaporate most will fall first, and those which lose this way the least quantity of their Juices will last longest. The Leaves are kept on Trees by a due supply of moisture from the Root: it is not that the Holly has more of this supply than Hawthorn; but it loses less: which in the end is just the same.

DECIDUOUS-LEAVED Trees become Evergreens in countries where the increased warmth of the air gives this supply; and in our own country the Holly and the like retain their Leaves, because the small pores and the thickened nature of the Juice prevent evaporation. The Sap is watery when it is received at the Root; but by that time it reaches the Leaves it is assimilated, and becomes of the nature of the Plant: therefore the tougher the nature of the Juices of the Plant are, the less supply will answer; because it is so much the more secure from loss by evaporation. This and the close texture of the Leaves themselves together give the quality of retaining the Leaves: and we see this illustrated by a most plain example in grafted and inoculated Trees, where the stock is a deciduous-leaved kind, and the graft an Ever-green. Many of the AMERICAN Oaks are Evergreen, and when we raise them on the stock of our own Oak, which is deciduous, they yet retain their Leaves all Winter.

ROOTS. *Bulbous &* *Tuberous.* Pl. 1.



B O O K II.

Of the EXTERNAL PARTS of PLANTS.

PLANTS are compos'd of various parts, that serve either for their GROWTH or PROPAGATION; the general name of the first is Vegetation; of the second, Fructification.

UNDER these two all parts are dispos'd ;

I. A TABLE of the PARTS of PLANTS subservient to their GROWTH.

I. RADIX, the ROOT. See Plates 1 and 2.

This is,

I. BULBOSA, BULBOUS.

Which is,

1. SOLIDA, SOLID, as the Crocus.

Pl. I. Fig. 1.

2. TUNICATA, COATED, as the Onion.

Pl. I. Fig. 2.

3. SQUAMOSA, SCALY, as the Lilly.

Pl. I. Fig. 3.

4. UNICA, SINGLE, as the Amaryllis, and most Bulbs.

Pl. I. Fig. 4.

5. DUPLICATA, PAIR'D, as the Fritillary.

Pl. I. Fig. 5.

VOL. II.

E

6. AGGREGATA,

6. AGGREGATA, CLUSTERED, as the Lady Traces.
Pl. 1. Fig. 6.
7. PALMATA, HANDED, as the handed ORCHIS.
Pl. 1. Fig. 7.

II. TUBEROSA, TUBEROSE.

Which is,

1. SESSILIS, JOINED TO THE STEM, as Cannacorus.
Pl. 1. Fig. 8.
2. PENDULA, HANGING TOGETHER BY THREADS, as Filipendula.
Pl. 1. Fig. 9.
3. FASCICULATA, FAGGOTED, as Piony.
Pl. 1. Fig. 10.
4. ARTICULATA, JOINTED, as Martynia.
Pl. 1. Fig. 11.
5. FUSIFORMES, SPINDLED, as Carrot.
Pl. 1. Fig. 12.
6. GLOBOSA, ROUNDED, as Crowfoot.
Pl. 1. Fig. 13.

III. FIBROSA ET OBLONGA. FIBROUS AND OBLONG. These consist of two Parts.

1. The CANDEX DESCENDENS, or Body of the Root.
2. The RADICULÆ, FIBRES in which it terminates, as the Long Rooted Hawk-weed. Pl. 2. Fig. 1. *a* the Candex, or Body; *b* the Fibres.
The Perennial Kinds are usuly crowned also with Buds, as in the Willow-herb. Pl. 2. Fig. 2.
The Fibrous Root is either,
3. CARNOSA, FLESHY, as Valerian.
Pl. 2. Fig. 3.
Or,
4. FILAMENTOSA, THREADY, as Grafts.
Pl. 2. Fig. 4.
The others are either,
5. SIMPLEX, SIMPLE, undivided as Mallow.
Pl. 2. Fig. 5.

6 RAMOSA,

ROOTS.

Page 10

Oblong & Fibrous.

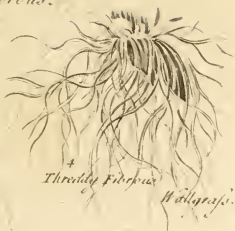
Pl. 2.

Older Root

a

Hard wood

Body of the Root



Horizontal Polypody

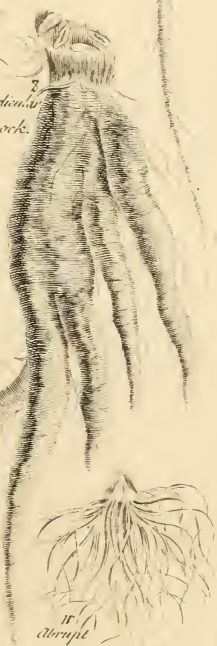
Perpendicular Dock

6

Fibrils



Branches Nettle





6. RAMOSA, BRANCHED, as Nettle.
Pl. 2. Fig. 6.
7. HORIZONTALIS, HORIZONTAL, as Polypody.
Pl. 2. Fig. 7.
8. PERPENDICULARIS, PERPENDICULAR, as Dock.
Pl. 2. Fig. 8.
9. INCLINATUS, INCLINED, as Thrift.
Pl. 2. Fig. 10.
10. REPENS, CREEPING, as Mint
Pl. 2. Fig. 9.
11. PREMORSA, ABRUPT, as Plantain.
Pl. 2. Fig. 11.

II. CAUDEX, the STEM. See Plates 3 and 4.

This includes,

- I. TRUNCUS, the TRUNK of TREES, SHRUBS, and UNDERSHRUBS.
- II. CAULIS, the STALK of HERBS.

These two are,

- I. SIMPLEX, Simple, where the Stem grows uninterrupted to the top.
- II. INTEGER, Unbranched, without Side-boughs.
 1. NUDUS, Naked, without Leaves, as Dodder.
Pl. 3. Fig. 1.
 2. FOLIOSUS, Foliated, with Leaves, as Gladiole.
Pl. 3. Fig. 2.
 3. RECTUS, Upright, as Gentianella. Pl. 3. Fig. 3.
 4. OBLIQUUS, Inclining, as Aphaca. Pl. 3. Fig. 4.
 5. FLEXUOSUS, Crooked, as Smilax. Pl. 3. Fig. 5.
 6. VOLUBILIS, Twining, as Bryony. Pl. 3. Fig. 6.
 7. PROCUMBENS, Lying Down, as blue Bindweed.
Pl. 3. Fig. 7.
 8. REPENS, Creeping, as Marsh Pennywort. Pl. 3. Fig. 8.
 9. SARMENTOSUS, producing Runners, as Asarabacca.
Pl. 3. Fig. 9.
 10. TERES, Cylindrical, as the Tulip. Pl. 3. Fig. 10.
 11. ANCEPTS, Two-cornered, or Angled, as Bermudiana.
Pl. 3. Fig. 11

12. TRIGONUS,

12. **TRIGONUS**, Three-cornered, as Long Cyperus. Pl. 3. Fig. 12.
13. **TETRAGONUS**, Square, as Mint. Pl. 3. Fig. 13.
14. **POLYGONUS**, Many-cornered, as the Cereus, Pl. 3. Fig. 14.
15. **STRIATUS**, Striated, or Channelled, as Spiderwort. Pl. 3. Fig. 15.
16. **CANALICULATUS**, Fluted, as Water Dropwort. Pl. 3. Fig. 16.
17. **GLABER**, Smooth, as Asphodel. Pl. 3. Fig. 17.
18. **VILLOSUS**, Woolly, as Pasque-flower. Pl. 3. Fig. 18.
19. **SCABER**, Rough, as Cleavers. Pl. 2. Fig. 19.
20. **HISPIDUS**, Harsh, Covered with hairy Prickles, as harsh Rudbeckia. Pl. 3. Fig. 20.
21. **PARASITICUS**, Parasitic, growing on another plant as Tillandsia. Pl. 3. Fig. 21.

II. RAMOSUS, Branched, or having Shoots from the Sides.

1. **ASCENDENS**, Ascending, the Branches rising upwards, as Rose-Campion. Pl. 4. Fig. 1.
2. **DIFFUSUS**, Spreading, as Columbine. Pl. 4. Fig. 2.
3. **BRACHIATUS**, In Great Arms, as Eryngium. Pl. 4. Fig. 3.
4. **RAMOSSIMUS**, In many Small Boughs, as Candy Alexanders. Pl. 4. Fig. 4.

To these also belong all the Distinctions of the **CAULIX**,
SIMPLEX INTEGER.

II. COMPOSITUS, Compound, the Stem losing itself in the Branches.

1. **DICHOTOMUS**, Forked, as Lambs Lettuce. Pl. 4. Fig. 5.
2. **DISTICHUS**, Spread, having double Rows of horizontal Branches, as Burnet Rose. Pl. 4. Fig. 6.
3. **SUBDIVISUS**, Subdivided, as Woad. Pl. 4. Fig. 7.
4. **FULCRATUS**, Prop'd, as Indian Fig. Pl. 4. Fig. 8.
5. **PROLIFER**, Proliferous, as the Pine. Pl. 4. Fig. 9.
6. **NODOSUS**, Jointed, as Pepper. Pl. 4. Fig. 10.

III. CULMUS, Straw, the Stalk of Grass.

1. **ENODIS**, Smooth, as Sea Grass. Pl. 4. Fig. 11.
2. **INTEGER**,

CAUDICES. Stems of Plants & Trees with their Branches. Pl. 4.



2. *INTEGER*, Simple, as Dogs-grafs. Pl. 4. Fig. 12.
3. *RAMOSUS*, Branched, as Water-grafs. Pl. 4. Fig. 13.
4. *EQUALIS*, Equal, having no protuberances, as Woodgrafs. Pl. 4. Fig. 14.
5. *ARTICULATUS*, Articulated, Jointed, as Manna-grafs. Pl. 4. Fig. 15.
6. *SQUAMOSUS*, Scaly, as Sea Dogs-grafs. Pl. 4. Fig. 16.
7. *NUDUS*, Naked, as spiked Water-grafs. Pl. 4. Fig. 17.
8. *FOLIOSUS*, Foliated, as common Meadow-grafs. Pl. 4. Fig. 18.

IV. *SCAPUS*, Flower-Stem, a simple Stalk rising directly from the Root.

1. *NUDUS*, Naked, as Hyacinth. Pl. 4. Fig. 19.
2. *FOLIOSUS*, Foliated, as Dogs-tooth. Pl. 4. Fig. 20.

III. *FULCRA*, the *SUPPORTS* or *APPENDAGES*.

See Plate 5.

These are Parts that either support or defend others. And first,

I. *PENDUNCULUS*, Pedicle, a Stalk carrying the Fructification.

1. *UNICAM*, a Single Fructification, as the Lilly. Pl. 5. Fig. 1.
2. *GEMINAM* Double, as the Mexican *Amaryllis*. Pl. 5. Fig. 2.
3. *PLURIMAM*, Many, as the *Plumeria*. Pl. 5. Fig. 3.
4. *NUMEROSAM*, Very Numerous, as *Geranium*. Pl. 5. Fig. 1.
5. *RADICALEM*, Rooted, issuing from the Root, as *Cyclamen*. Pl. 5. Fig. 5.
6. *CAULINAM*, Stalked, proceeding from the Stem, as *Hibiscus*. Pl. 5. Fig. 6.
7. *ALAREM*, Winged, growing from the Junction of the Bough to the Stem, *Campanula*. Pl. 5. Fig. 7.
8. *TERMINATRICEM*, Terminating the Branch or Stem, as *Herb-Paris*. Pl. 5. Fig. 8.

9. SOLITARIAM, Only one Pedicle, as Globe Crowfoot.
Pl. 5. Fig. 9.
 10. SPARSIM, Several up and down, as alternate Gladiole.
Pl. 5. Fig. 10.
 11. CONGLOBATAM, Gathered in a Ball, as Globe Amaranth. Pl. 5. Fig. 11.
 12. CONGLOMERATAM, In several little Bodies, as Fox-tail Astragalus. Pl. 5. Fig. 12.
 13. PANNICULATUM, Pannicled, as Bent-grass.
Pl. 5. Fig. 13.
 14. CORYBOSAM, In round Bunches, as Camara.
Pl. 5. Fig. 14.
 15. FASCICULATAM, In little Fagots, the Bottoms all issuing from the same Point, as Sweet William.
Pl. 5. Fig. 15.
 16. UMBELLATIM, Umbrella'd, as Chervil. Pl. 5. Fig. 16.
 17. CAPITAM, Headed, as Corn-flower. Pl. 5. Fig. 17.
 18. VERTICILLATIM, Whorled, as Molucca Baum.
Pl. 5. Fig. 18.
 19. SPICATIM, Spiked, as Veronica. Pl. 5. Fig. 19.
 20. THYRSATIM, Towered, in a Sort of Spike like a Pine Cone, as Butter-burr. Pl. 5. Fig. 20.
 21. RACEMOSIM, Growing thick along the Branches, as Arbutus. Pl. 5. Fig. 21.
- II. PETIOLUS, the Leaf-Stalk, as in Heliotrope. Pl. 5. Fig. 22.
- III. CIRRHUS, the Clasper, or Tendril, as Trichosanthes.
Pl. 5. Fig. 23.
- IV. BRACTEA, the Scale, or Floral-leaf, never appearing but with the Flower, as in the Lime, Pl. 5. Fig. 24.
- V. STIPULA, the Film, as in the Rose. Pl. 5. Fig. 25.
- VI. ACULEUS, a Prickle, this grows to the Rind, and may be separated, without tearing the Plant, as in the Bramble.
Pl. 5. Fig. 26.
- VII. SPINA, a Thorn, this grows from the Wood; and tears the Plant when separated, as Buckthorn. Pl. 5. Fig. 27
- VIII. GLAN



VIII. GLANDULA, a Gland, or separating Duct, as in the Passion Flower. Pl. 5. Fig. 28.

IX. SQUAMMA, a Scale, as in the Clandestina. Pl. 5. Fig. 29.

IV. FOLIA, LEAVES. See Plates 6, 7, 8, 9.

The Leaf of a Plant is either,

I. SIMPLEX, Single, one upon a Stalk. This admits of being considered seven different ways; and first as to its

I. CIRCUMSCRIPTIO, Circumference. This depends on the Round of the Leaf considered as entire, abstracting from its Angles and Sinuses, and not regarding the extremity of the Sides and Top. In this Light there are,

1. ORBICULATUM, Round, viz. Length and Breadth equal, and the Sides equally distant from the Centre, as Navelwort. Pl. 6. Fig. 1.

2. SUBROTUNDUM, Roundish, viz. broader than long, though used with more Latitude to express the first, as round-leaved Cyclamen. Pl. 6. Fig. 2.

3. OVATUM, Egg'd, longer than broad; the Bottom in the Segment of a Circle, but tapering to the Top, as Yellow Pimpernel. Pl. 6. Fig. 3.

* 4. OBVERSE-OVATUM, Revers'd Egg'd, viz. the lesser End joined to the Stalk, as Samolus. Pl. 6. Fig. 4.

5. OVALE, Oval or Elliptical, viz. longer than broad, but both Top and Bottom Segments of Circles, as Turnsole. Pl. 6. Fig. 5.

6. OBLONGUM, Oblong, viz. whose Length exceeds several times the Breadth, but narrower at Top and Bottom than the Segment of a Circle, as Peach-leaved Bellflower. Pl. 6. Fig. 6.

7. SPATULATUM, Spatula'd, that is, rounded with an oblong, narrow Base as Indian Bellflower. Pl. 6. Fig. 7.

8. PARABOLICUM, Long Oval, an oblong Oval narrowed to the Top, as small Amaryllis. Pl. 6. Fig. 8.

9. CUNEIFORME, Wedg'd, the Stalk supporting the small end, as Dwarf Auricula. Pl. 6. Fig. 9.

II. ANGULI,

II. **ANGULI**, Angles, viz. the salient Parts of a Leaf, contrary to the inward Angle, called Sinus, which does not exist in the Leaf, but is an empty Space formed by Part of the Leaf being taken away. Angles are all different from Latera, the Sides; these are only in a Plant placed perpendicular, as Torch-thistle, &c. Angles in flat horizontal Leaf. These are expressed by,

10. **LANEOLATUM**, Lanced; this is the fifth, but more tapering from the Middle to the Top and Base, as Spearwort Crowfoot. Pl. 6. Fig. 10.
11. **LINEARE**, Linear, two Sides parallel, tho' often approaching towards the Top and Base, as Toadflax. Pl. 6. Fig. 11.
12. **SUBULALUM**, Awl'd, linear to the Middle, thence to the Top gently sloping so as to meet, as Spike Lavender. Pl. 6. Fig. 12.
13. **ACEROSUM**, Chaffy, that is linear and permanent, with a Chaffy Base, as Pine. Pl. 6. Fig. 13.
14. **TRIANGULARE**. In these the Sides are formed by strait Lines, and the lower Angles horizontal with the Base, as in White Orach. Pl. 6. Fig. 14.
15. **DELTOIDES**, Quadrangled, the Side ones nearer the Middle than those at the Top and Base, as Sea-Purslain-tree. Pl. 6. Fig. 15.
16. **QUINQUANGULARE**, Pentangular, the Sides strait Lines, unless (as sometimes happens) they are broken by Sinus's, as Sanicle. Pl. 6. Fig. 16.
17. **ROTUNDATUM**, Rounded, this having no Angle, is the opposite of the last mentioned Kinds, as Sundew. Pl. 9. Fig. 17.

III. **SINUS**, the Sines, or Inward Angles. These are at the Base, at the Top, at the Sides, or all around.

18. **RENIFORME**, Kidney-shaped, is the 2d, hollowed out at the Base, without Angles, as Asarabacca. Pl. 6. Fig. 18.
19. **CORDATUM**, Hearted, is the 2d, hollowed at the Base, without large Angles, as Parnassia. Pl. 6. Fig. 19.

LEAVES. The Characters of their Outlines, Angles and Division. Pl. 6



20. OBFERSE CORDATUM, The Former Revers'd, viz. when the Pedicle joins the Top, as Heart Trefoil. Pl. 6. Fig. 20.
21. LUNALATUM, Moon'd, the 2d, hollowed at the Base, with the Angles Hook-shaped, as Indian Arrowhead. Pl. 6. Fig. 21.
22. SAGITATUM, Arrow'd, is the 10th, hollowed at the Base, as common Water Arrowhead. Pl. 6. Fig. 22.
23. CORDATO SAGITATUM, The former with Convex Sides, as Black Bindweed. Pl. 6. Fig. 23.
24. HASTATUM, Speared, the 10th, with the Base and Sides scooped hollow, the Angles pointing downwards, as English Mercury. Pl. 6. Fig. 24.
25. PANDURI-FORME, Fiddled, is the 5th, swelling out at Top, more at the Bottom; but shrinking in at the Sides, as Fiddle Dock. Pl. 6. Fig. 25.
26. BIFIDUM, Bifid, a Leaf divided at the Top in two, the inward Sides of the division strait, and this holds (Number excepted) for 3fid, 4fid, &c. as Stary Water Plantain. Pl. 6. Fig. 26.
27. TRILOBUM, Three-lobed, viz. divided to the Middle in three Parts that spread asunder, with convex Margins, and the same of two lob'd, four lob'd, &c. (Number excepted) as Bastard Cinquefoil. Pl. 6. Fig. 27.
28. PALMATIM, Palmed, divided like the Hand, from the Top beyond the Middle, or even to the Base, as Ricinus. Pl. 6. Fig. 28.
29. PEDATUM, Footed, handed, but with the Footstalk continued and divided, as Hellebore. Pl. 6. Fig. 29.
30. PINNATIFIDUM, Feathered, cut into several large horizontal Slips, separated by horizontal Sinus's, as Star Thistle. Pl. 6. Fig. 30.
31. LYRATUM, Harped, cut transversly in Jaggs, and largest upwards, as Winter Cress. Pl. 6. Fig. 31.
32. LACINATUM, Jagged, when cut to the Middle by several Sinus's and the Lobes subdivided, as Ragwort. Pl. 6. Fig. 32.

33. SINUATUM, Opened, when there are several Sinus's round the Leaf separated by Lobes scarcely divided, as Saxifrage. Pl. 6. Fig. 33.
34. PARTITUM, Parted to the Base, as wild Columbine. Pl. 6. Fig. 34. This is Quinquepartite, or divided into five: It is the same of Bipartitum, Tripartitum, &c. Number excepted.
35. DIVISUM, Divided, cut deep, with great Segments, as Solstitial Thistle. Pl. 6. Fig. 35.
36. BIPARTITUM, Twice divided, cut into deep Lobes, and those split again, as wild Shrub Cinquefoil. Pl. 6. Fig. 36.
37. INTEGRUM, Entire, as long-leaved Cistus. Pl. 6. Fig. 37. Therefore opposed to 14---27, but with no regard to the Margin.

VI. APEN. The Top or Summit, this terminates the Leaf opposite to its Insertion.

A Leaf in this respect may be either,

38. TRUNCATUM, Abrupt, as in the Tulip-tree. Pl. 7. Fig. 1.
39. PRÆMORSUM, Bitten, divided at the Top into unequal Segments, as American Maple. Pl. 7. Fig. 2.
40. RETUSUM, Blunted, where the Top is terminated by an obtuse Sinus, as Marsh Marygold. Pl. 7. Fig. 3.
41. EMARGINATUM, Notched at the Top, as round-leav'd Capers. Pl. 7. Fig. 4.
42. ---OBTUSE EMARGINATUM, with the Notch terminated by obtuse Summits, as Tree-houseleek. Pl. 7. Fig. 5.
43. ---- ACUTE EMARGINATUM, with the Notch terminated by acute Summits, as bifid Daisy. Pl. 7. Fig. 6.
44. OBTUSUM, Obtuse, when the Top is the Segment of a Circle, as in Wintergreen. Pl. 7. Fig. 7.
45. ACUTUM, Sharpened, terminated by a sharp Angle, as in One Blade. Pl. 7. Fig. 8.
46. ACUMINATUM, Pointed, when terminated by a long Awl-shaped Point, as Dwarf Arum. Pl. 7. Fig. 9.

47. OB-

47. *OBTUSUM CUM ACUMINE*, Blunt with a Point, where the Summit is obtuse, but terminates in a little sharp Point, as Stinking Orach. Pl. 7. Fig. 10.
48. *CIRRHOsum*, Tendrilled, terminated by a Tendril, as Gloriosa. Pl. 7. Fig. 11.
49. *SPINOSUM*, Prickly, the Edge running out into stiff and sharp Thorns, as wild Acanthus. Pl. 7. Fig. 12.
50. *INERME SPINOSUM*, Soft Prickled, the Edge terminating in soft, harmless Thorns, as gentle Thistle. Pl. 7. Fig. 13. Inerme used without the Addition *Spinosum*, expresses a plain, smooth Edge.

IV. *MARGO*, The Margin. The Divisions under this Head have no regard to the Disk or Edge of the Summit.

51. *DENTATUM*, Toothed, with horizontal Points proceeding from the Margin, of the same Consistence with the Leaf, separate and distinct, as Great Daisy. Pl. 7. Fig. 14.
52. *SERRATUM*, Sawed, with little sharp Angles or Teeth, placed like Tiles over one another, generally pointing towards the Top, as in the Horse-mint. Pl. 7. Fig. 15.
53. ---- *RETRORSUM SERRATUM*, Sawed downwards, where the Teeth point down to the Base, as in Asiatic Hoarhound. Pl. 7. Fig. 16.
54. ---- *OBSOLETE SERRATUM*, Blunt sawed, as Ballote. Pl. 7. Fig. 17.
55. ---- *CRENATUM*, Dented, the Edge terminated with blunt horizontal Points, as in Wood Betony. Pl. 7. Fig. 18.
56. ---- *DUPLICATO SERRATUM* Sawed double, with lesser Teeth within the greater, as Water Hoarhound. Pl. 7. Fig. 19.
57. *REPANDUM*, Nurlled, where the Margin is edged with little Lobes, that are so many Segments of Circles, separated by obtuse Sinuses, as Poleymountain. Pl. 7. Fig. 20.
58. *CARTILAGINEUM*, Edged, this Edge is the skinny Border of a fleshy Leaf, as Silver Sedum. Pl. 7. Fig. 21.
59. *CILIA-*

59. CILIATUM, Eyelashed, where the Leaf is surrounded by a Margin of parallel Hairs, like the Eyelash, as in ciliated Rhododendrum. Pl. 7. Fig. 22.
 60. LACERUM, Torn, the Margin composed of Segments closely joined, of unequal Shape and Size, as in Succory Hawkweed. Pl. 7. Fig. 23.
 61. EROSUM, Gnawed, where the Disk of the Leaf is sinuated, and other little obtuse sinuses divide the Margin, as in Groundsell. Pl. 7. Fig. 24.
 62. INTEGERIMUM, Entire at the Margin, as Twyblade. Pl. 7. Fig. 25.
- V. SUPERFICIES, The Surface of the Leaf. In this respect, a Leaf may be,
63. VISCIDUM, Glutinous, as Henbane, Pl. 7. Fig. 26.
 64. TOMENTOSUM, Downy, where the Hairs are hardly to be distinguished, as Common Mullein. Pl. 7. Fig. 27.
 65. LANATUM, Woolly, covered as with a Web of woolly Matter, as Great Ironwort. Pl. 7. Fig. 28.
 66. PILOSUM, Hairy, where the Hairs are distinct, as in Mouse-ear. Pl. 7. Fig. 29.
 67. HISPIDUM, Bristly, the Superficies spread with stiff brittle Bristles as Bastard Hemp. Pl. 7. Fig. 30.
 68. SCABRUM, Rugged, sufficient to make the Disk of the Leaf uneven, as in wild Clary. Pl. 7. Fig. 31.
 69. ACULIATUM, Thorny, with sharp cartilaginous Prickles on the Surface of the Leaf, as Indian Nightshade. Pl. 7. Fig. 32.
 70. STRIATUM, Streaked, marked lengthwise with hollow, strait Lines, as in the thick-leav'd Aloe. Pl. 4. Fig. 33.
 71. PAPILOSUM, Warty, the Surface covered with little Bladders, as the Ice plant. Pl. 7. Fig. 34.
 72. PUNCTATUM, Dotted, with small hollows, as dotted Aloe. Pl. 7. Fig. 35.
 73. NITIDUM, Shining, and very smooth, as if polished, as Black Briony. Pl. 7. Fig. 36.
 74. PLICATUM, Plaited, where Vessels or Nerves spread from

LEAVES. The Characters of their Terminations, Edges, Surface. Pl. 7.



from the Base to the Edge of a Leaf, rising and falling the Disk alternately in sharp Angles, as in Lady's-Mantle. Pl. 7. Fig. 37.

75. **UNDULATUM**, Waved, where the outward Part of the Disk is of a larger Circumference than a Circle can be, of the same Diameter, and becomes alternately convex and concave, as in Rhubarb. Pl. 7. Fig. 38.
76. **CHRISPUM**, Curled, is yet a greater Degree of Waving, laying in the Edge in circular Folds, as in curled Mallow. Pl. 7. Fig. 39.
77. **RUGOSUM**, Furrowed, is when the hollowed Veins are too near to admit the Substance of the Disk that then swells out, as in sage. Pl. 7. Fig. 40.
78. **CONCAVUM**, Hollow, when the Edge is less than the Disk, and draws it in, as in Mountain Bindweed. Pl. 7. Fig. 41.
79. **VENOSUM**, Veined, where the Leaf is covered with small Ramifications, as Hedge-Nettle. Pl. 7. Fig. 42.
80. **NERVOSUM**, Nervous, where simple unbranched Vessels run from the Base to the Top, as in Plantain. Pl. 7. Fig. 43.
81. **COLORATUM**, Coloured, when diversified with other Colours besides Green, as Amaranth. Pl. 7. Fig. 44.
82. **GLABRUM**, Smooth, when the Surface is perfectly even, as Enchanters Nightshade. Pl. 7. Fig. 45.

VI. **LÆTERA**, The Sides; and whatever appears viewing the Leaf perpendicularly.

A Leaf of a Plant may be in this respect either,

83. **TERES**, Cylandrick, tho' in this Case the Top is usually pointed, as Stonecrop. Pl. 8. Fig. 1.
84. **SEMI-CYLINDRICK**, Hollow only on one Side, flat on the other, as spotted Aloe. Pl. 8. Fig. 2.
85. **TUBULOSUM**, Hollow, as a Pipe, as the Leaf of the Onion. Pl. 8. Fig. 3.

86. CARNOSUM, Fleſhy, the Membranes diſtant, but the Hollow filled with Pulp, as Pincuſhion Aloe. Pl. 8 Fig. 4.
87. COMPRESSUM, Preſſed, when preſſed back at the Sides, as Indian-Colchicum. Pl. 8. Fig. 5.
88. PLANUM, Plane when both Sides are even, as ſpotted Orchis. Pl. 8. Fig. 6.
89. GIBBUM, Swolen, riſing in ſome degree on both ſides, as thick-leaved Hæmanthus. Pl. 8. Fig. 7.
90. CONVEXUM, Raiſed, elevated on the upper part of the Diſk, as Orchoide Hyacinth. Pl. 8. Fig. 8.
91. CONCAVUM, Hollow in the Middle, as broad Pancratium. Pl. 8. Fig. 9.
92. CANALICULATUM, Fluted, fluted lengthwiſe into the half of a hollow Cylinder or Cone, as Socotrine Aloe. Pl. 8. Fig. 10.
93. ENSIFORME, Sworded, with a ſharp Margin on each Side, and convex Lengthways, with an Angle, as blue Iris. Pl. 8. Fig. 11.
94. ACINACIFORME, Sabred, Lanced, the under ſides convex, the under Margin obtuſe and ſtraightened, the upper acute, as ſabred Ficoides. Pl. 8. Fig. 12.
95. DOLABRIFORME, Battledoor'd, roundiſh, obtuſe, ſalient and ſharp above, but almoſt cylindrical below, as Battledoor Ficoides. Pl. 8. Fig. 13.
96. LINGUIFORME, Tongued, linear, obtuſe, fleſhy flattened, convex above, and generally with a ſkinny Margin, as Tongued Amaryllis. Pl. 8. Fig. 14.
97. ANCEPS, Two-edged, as Cyperus-Graſs. Pl. 8. Fig. 15.
98. TRIQUETRUM, Three-edged, with three flat Sides, often Awlſhaped, as great Cyperus. Pl. 8. Fig. 16.
99. TRIGONUM, Triangled, as the laſt, but the Sides Gutter-shaped, and the pointed Angles membranaceous, as Maſh Cyperus graſs. Pl. 8. Fig. 17.
100. SULCATUM. Furrowed, with many Angles, and obtuſe Sinuſes between them as Ribbed Aloe. Pl. 8. Fig. 18.

101. CARINATUM, Keeled, or edged lengthways on the Back, as the keeled Aloe. Pl. 8. Fig. 19.
102. MEMBRANACEUM, Membranaceous, without Pulp, as Valineria. Pl. 8. Fig. 20.
- II. COMPOSITA, Compound Leaves : when several small Leaves grow on one Leaf-stalk, they form a compound Leaf, which is either,
103. COMPOSITUM PROPRIE DICTUM, Properly so called, where compounded but once, as Columbine. Pl. 8. Fig. 21.
104. ARTICULATUM, Jointed, when one Leaf grows from the Top of another, as Glaswort. Pl. 8. Fig. 22.
105. DIGITATUM, Digitated : where several Leaflets, or small Leaves, grow at the End of one Stalk : strictly where more than four Leaflets are so placed, as in Dragons. Pl. 8. Fig. 23.
106. BINATUM, Paired that is digitated with only two Leaves, as binate Bignonia. Pl. 8. Fig. 24.
107. TERNATUM, In Threes, where three Leaves grow together at the End of one Leaf-stalk : This is either, FOLIOLIS SESSILIBUS, where the Leaflets have no stalks of their own, as Water Ivy. Pl. 8. Fig. 25.
Or, FOLIOLIS PETIOLATIS, each Leaflet having its own Stalk as Azorian Jasmine. Pl. 8. Fig. 26.
108. QUINATUM, By Fives, viz. five Leaflets on one common Stalk, as Lupine. Pl. 8. Fig. 27.
109. PINNATUM, Winged, viz. some of the Leaflets placed on each side of the common Stalk, like Feathers, as Goats Rue. Pl. 8. Fig. 28.
110. PENNATUM CUM IMPARI, Winged compleat, the Leaf terminated by one single Leaflet, as in the Chick. Pl. 8. Fig. 29.
- III. CIRRHATUM, Tendrill'd, the Leaf ending in a Tendril, as Pea. Pl. 8. Fig. 30.

ABRUPTUM

- 112. **ABRUPTUM**, Abrupt, without an odd Leaf or Tendril, as *Abrus*. Pl. 8. Fig. 31.
- 113. **OPPOSITE**, The Leaflets placed opposite, as in *Saintfoin*. Pl. 8. Fig. 32.
- 114. **ALTERNATIM**, Placed alternate, as in *Fraxinella*. Pl. 8. Fig. 33.
- 115. **INTERRUPTA**, The Leaflets unequal, as in *Mountain Avens*. Pl. 8. Fig. 34.
- 116. **ARTICULATE**, Chain'd, the Leaflets joined to a jointed Footstalk, as jointed *Vetch*. Pl. 8. Fig. 35.
- 117. **FOLIOLIS DECURRENTIBUS**, Running, the Leaflets growing down the Stalk, as *decurent Pea*. Pl. 8. Fig. 36.
- 118. **CONJUGATIM**, Pair'd, the former with only a pair of Leaflets, as *Lathyrus*. Pl. 8. Fig. 37.
- 119. **DECOMPOSITA**, Recompound Leaves, these have the Leaf Stalk twice divided before it supports the Leaflet, as *Red Rattle*. Pl. 8. Fig. 38.
- 120. **DUPLICATO TERNATUM**, seu **TERNATO TERNATUM**, Thrice three'd, is a Recompound with three Leaflets, as *Barrenwort*. Pl. 8. Fig. 39.
- 121. **BIGEMINATUM**, Redoubled, Recompofite in Pairs, as *African Mistletoe*. Pl. 8. Fig. 40.
- 122. **DUPLICATO PINNATUM**, seu **PINNATO PINNATUM**, Twice winged, Recompound Pinnated, as *Chervill*. Pl. 8. Fig. 41.
- 123. **SUPRADECOMPOSITUM**, Thrice winged, or Super-compound, these have the Leaf-stalk often (at least more than twice) divided before it supports the Leaflets, as common *Alexanders*. Pl. 8. Fig. 42.
- 124. **TRIPPLICATO TERNATUM**, seu **TERNATO TERNATUM**, is a Super-compound with three Leaflets as small *Aralia*, Pl. 8. Fig. 43.
- 125. **TRIPPLICATO PINNATUM**, seu **PINNATO PINNATUM**, Branched, is a Super-compound pinnated, with pinnated Leaflets, as *Candy Alexanders*. Pl. 8. Fig. 44.

LEAVES. *The Characters of their Substance, Structure & Composition. Pl. 6.*



III. DETERMINATIO, The Determination of Leaves, consists in those differences that distinguish Leaves without having regard to their Make, and consists of four orders.

I. LOCUS, The Place or Part of the Plant the Leaf is fixed to.

- 126. SEMINALE, Seminal Leaf or Cotyledon, as in the Turnip. Pl. 9. Fig. 1.
- 127. RADICALE, Radical, springing directly from the Root, as in small Bell-flower. Pl. 9. Fig. 2.
- 128. CAUDICIS, Of the Stem, growing on the Stem, as on the Stalk of the same Plant. Pl. 9. Fig. 3. The Form of these is quite different.
- 129. RAMORUM, Of the Branches, placed on the Branches, as in motherwort. Pl. 9. Fig. 4.
- 130. AXILARE, Of the Wings, placed under the Points the Branches spring from, as in Saw-wort. Pl. 9. Fig. 5.
- 131. FLORALE, Floral, next the Flower, as in African Sage. Pl. 9. Fig. 6.

II. SITUS, The situation of the Leaf with regard to the rest.

- 132. STELLATA, Stellated, when six Leaves or more surround the Stalk in a Ring, as in Madder. Pl. 9. Fig. 7.
TERNA QUATERNA, Three, Four, &c. so disposed, are also Species of the last, but their Numbers constant.
- 133. OPPOSITA, Opposite Leaves, the Stem intervening, these grow in Pairs, as in White Lychnis. Pl. 9. Fig. 8.
- 134. ALTERNA, Alternate, one above another in a somewhat regular Order, as in Elychritum. Pl. 9. Fig. 9.
- 135. SPARSA, Scattered, growing without any Order on the Stalk, as in Milkwort. Pl. 9. Fig. 10. When these stand very close, they are said to be,

CONFERTA, Huddled together, so that their Situation cannot be perceived.

136. IMBRICALA, Tiled, growing over one another, like Tiles, as in great Houseleek. Pl. 9. Fig. 11.

137. FASCICULATA, Clustered, if several proceed from the same Point, as in the Larix. Pl. 9. Fig. 12.

138 DISTICHA, Spread, Leaves growing on the Branches regularly on the two Sides, as Fir. Pl. 9. Fig. 13.

III. DIRECTIO, Is the Expansion a Leaf acquires from the Base to the Summit.

I. INSERTIO, Infertion of the Leaves, viz. according to the Manner they are joined to the Stalk.

139. PELTATUM, Shieldways, when the Stalk is fastened to the Disk of the Leaf, as in scarlet Water Lilly. Pl. 9. Fig. 14.

140. PETIOLATUM, Footstalked, is when the Stalk advances into the Margin at the Bottom of the Leaf, as in Arbutus. Pl. 9. Fig. 15.

141. SESSILE, Sessile, growing without a Stalk to the Stem or Twig, as spotted Lungwort. Pl. 9. Fig. 16.

142. DECURRENS, Running, as in the last, but where the lower part is extended below the Base, clinging down the Stem, as in alated Verbefina. Pl. 9. Fig. 17.

143. AMPLEXICAULE, Embracing, the Base Stretching so as to surround the Stem on all Sides; this generally happens with a Sessil Heart or Arrow shaped Leaf, as in common Thlaspi. Pl. 9. Fig. 18.

144. SEMI-AMPLEXICAULE, Half-surrounding, where the Lobes at the Base of the Leaf are too short to surround the Stalk entirely, as in Mithridate Mustard. Pl. 9. Fig. 19.

145. PER-

LEAVES. Their Distinctions according to their places. Pl. 9.



- 145. *PERFOLIATUM*, Perfoliated, where the Stem or Branch perforates the Disk of the Leaf without adhering to its Margin, as in thoroughwax. Pl. 9. Fig. 20.
- 146. *CONNATA*, United, where opposite Leaves join at the Base in one, as in Teasell. Pl. 9. Fig. 21.
- 147. *VAGINANS*, Tubular, the Base of the Leaf turning like a Cylinder round the Stem or Stalk, as in Bistort, Pl. 9. Fig. 22.
- 148. *ADVERSUM*, Adverse, where the Leaf turns its Side not upwarwds, but to South of the Horizon, as in the Ginger. Pl. 9. Fig. 23.
- 149. *OBLIQUUM*, Oblique, when the Base of the Leaf rises upward but the Point turns horizontally, as in Fritillary. Pl. 9. Fig. 24.
- 150. *INFLEXUM*, Inflected, bending upwards towards the Plant, as in the Orchis. Pl. 9. Fig. 25.
- 151. *ADPRESSUM*, Pressed, growing up close to the Stalk, as in common Thlaspi. Pl. 9. Fig. 26.
- 852. *ERECTUM*, Upright, making an acute Angle with the Perpendicular, as in narrow-leaved Catchfly. Pl. 9. Fig. 27.
- 153. *PATENS*, Spreading, in an obtuse Angle from the Perpendicular, as in Brook-lime. Pl. 9. Fig. 28.
- 154. *HORIZONTALIS*, seu *PATENTISSIMUM*, Flat, at right Angles with the Perpendicular, as in small Speedwell. Pl. 9. Fig. 29.
- 155. *RECLINATUM* et *REFLEXUM*, Bending down, so that the Top is lower than the Base, as in Tutfan. Pl. 9. Fig. 30.
- 156. *REVOLUTUM*, Curled down, the Summit turned like a Volute downwards, as in Sweet William. Pl. 9. Fig. 31.

157. *DEPENDENS*, Drooping, hanging with the Point towards the Earth, as Succory. Pl. 9. Fig. 32.
158. *RADICANS*, Top-rooted, the Leaf-top taking Root, as American Hearts-tongue. Pl. 9. Fig. 33.
159. *NATANS*, Floating, on the Surface of the Water, as Pondweed. Pl. 9. Fig. 34.
160. *DEMERSUM*, Drowned, keeping always under Water, as Water Violet. Pl. 9. Fig. 35.

II. A TABLE of the PARTS of PLANTS subservient to their FRUCTIFICATION

I. FLOS, the FLOWER. See Plate 10.

I. CALIX, the Cup. This is either,

1. *INVOLUCRUM*, the Mantle; this surrounds several Flowers clustered together, and is most frequent in the Umbelliferæ, as in Fools Parsley Pl. 10. Fig. 1. It is of two Kinds,
 1. *UNIVERSALE*, General, surrounding the Base of the whole Umbrella. Pl. 10. Fig. 1. *a*
 2. *PARTIALE*, Partial, placed under the Subdivisions of the Umbrella. Pl. 10. Fig. 1. *b*
2. *SPATHA*, the Sheath, this is a Film which bursts lengthwise, as in the Narcissus. Pl. 10. Fig. 2.

3. *PERI-*

3. **PERIANTHUM**, the Cup; this is an herbaceous Cover of the Flower, and is the commonest Calix of any other. It is of three Kinds,
 1. **FRUCTIFICATIONIS**, of the Entire Fructification, when it contains Chives and Germ, as in the Polyanthus. Pl. 10. Fig. 3.
 2. **FLORIS**, of the Flower, containing Chives and no Germ as the Male Flowers of Mistletoe. Pl. 10. Fig. 4.
 3. **FRUCTUS**, of the Fruit, containing the Germ and no Chives, as the Female Flowers of the Mistletoe. Pl. 10. Fig. 5.
4. **AMENTUM**, Katkin-cup. This furrounds, either wholly or in part, the Chives of those Plants that bear their Fruit in loose long Strings, as Hazle, &c. Pl. 10. Fig. 6. It is also used for the entire Katkin itself.
5. **GLUMA**, the Husk or Chaff of Corn, Grass, &c. as in the Oat. Pl. 10. Fig. 7.
6. **CALYPTRA**, the Hood; this is a thin Membrane covering the parts of Fructification: and frequently attends the Flowers of the Mosses, as upright Bryum. Pl. 10. Fig. 8.
7. **VOLVA**, the Whorl, the membranaceous Cup of the Mushroom Head. Pl. 10. Fig. 9.

II. **CORROLA**, the Petal, as in Marvel of Peru. Pl. 10. Fig. 10.

This consists of,

1. **TUBUS**, the Tube, as in the Crocus. Pl. 10. Fig. 11.
2. **UNGUES**, Tube Nails, as in Indian Cress. Pl. 10. Fig. 12.
3. **LIMBUS**, the Brim or border; this is the entire outer Verge, as in white Daffodill; Pl. 10. Fig. 13. and is of five Kinds.
 1. **CAMPANULATUS**, Bell-shap'd, as Canary Bell-flower. Pl. 10. Fig. 14.
 2. **INFUNDIBULIFORMIS**, Funnel-shap'd, as Tobacco. Pl. 10. Fig. 15.

3. HYPERCRATERI-FORMIS, Saucer'd, as Primrose. Pl. 10. Fig. 16.
4. ROTATUS, Wheel'd, as Borage. Pl. 10. Fig. 17.
5. RINGENS, Labiated, as Sage. Pl. 10. Fig. 18.
6. LAMINA, the Plate, the thin outer Part of a Flower, as in Lady-Smock. Pl. 10. Fig. 19.
 1. This is CRUCIFORMES, Crossed, as Rocket. Pl. 10. Fig. 20. Or,
 2. PAPILIONACEUS, Butterfly'd, as Lathyrus. Pl. 10. Fig. 21.
7. NECTARIUM, the Nectary, a Part distinct from all others in the Flower, as in Helleboraster. Pl. 10. Fig. 22.

III. STAMINA, the Chives. These consist of Threads crowned with swollen summits, as in the Guernsey Lilly. Pl. 10. Fig. 23.

1. FILAMENTA, the Threads, as in the Day Lilly. Pl. 10. Fig. 24.
2. ANTHERA, Summit, as in Jacobæan Amaryllis. Pl. 10. Fig. 25.
3. POLLEN, the Farina, the Powder contained in the Summits, as in sweet Pancratium. Pl. 10. Fig. 26.

IV. PISTILLUM, the Pointal, as in the scarlet Lilly. Pl. 10. Fig. 27. This consists of three Parts.

1. GERMEN, the Germ, or Rudiment.
2. STYLUS, the Style.
3. STIGMA, the Button. These are shewn separate in Fig. 28.

II. FRUCTUS.

V. PERICARPIUM, Whatever covers and contains the Seeds. This may be either,

1. CAP-

PARTES FRUCTIFICATIONIS. Parts of Plants taken, &c. to their Fructifications. Pl. 16





1. CAPSULA, a Capsule, or hollow Vessel bursting open in a regular Manner, as in Fritillary. Pl. 9. Fig. 29. and 30. This properly contains four Parts.
 1. VALVULÆ, the Sides. Fig. 30. *a*.
 2. DISSEPIMENTA, the Partitions. Fig. 30. *b*.
 3. COLUMELLA, the Column, joining the Partitions and Seeds. Fig. 30. *c*.
 4. LOCULAMENTA, the Cells, the Cavities holding the Seeds. Fig. 30. *d*.
 2. SILIQUA, the Shell, a Seed-vessel of two regular Valves with the Seeds adhering to both the Sutures, as in Stock Julyflower. Pl. 10. Fig. 31.
 3. LEGUMEN, a Pod, a Seed-vessel of two Valves, with the Seeds fixed to only one of the Sutures, as in Lupine. Pl. 10. Fig. 32.
 4. CONCEPTACULUM, a Coat of one Piece, as in Hellebore. Pl. 10. Fig. 33.
 5. DRUPA, the Drupe, a single Shell coated and containing a Nut, as in the Almond. Pl. 10. Fig. 34.
 6. BACCA, a Berry, a simple Fruit with Seeds uncovered by any Shell, as in Nightshade. Pl. 10. Fig. 35.
 7. POMUM, an Apple, a Fruit containing a Capsule of Seeds, as in the common apple. Pl. 10. Fig. 36.
 8. STROBILUS, a Cone, a Fruit formed of a swelled Katkin, as the Pine Cone. Pl. 10. Fig. 37.
- VI. SEMEN, a Seed, as of the Pea. Pl. 10. Fig. 38. This properly consists of Six Parts. Pl. 10. Fig. 59. These are,
1. CORUCLUM, the Heart. Pl. 10. Fig. 39. *a. b.*
Having its PLUMULA, Plume, *a.* and ROSELLUM, Beak, *b.*
 2. COTYLIDONES, Placentæ, *c. c.*
 3. HILUS, Scar, *d.*
 4. ARILLUS, Coat, *e.*
- Some Seeds have also the CORONULA, Crown, as Dandelion. Pl. 10. Fig. 40. Consisting of,
PAPPUS

PAPPUS the Down, *a.* and STIPES, Support,
b. Others have also Wings, as Maple. Pl. 10.

Fig. 41.

Some also are NUCES, Nuts, covered with a woody
 outer Skin, as Filberd. Pl. 10. Fig. 42.

Others naked, as

PROPAGO, Shoot, as in Mosses. Fig. 43.

III. RECEPTACULUM, the Receptacle. This is the Part which
 gives Infertion to the Flower; and it is either,

I. NUDUM, Naked, as in Dandelion. Pl. 11. Fig. 1.

II. PALEACEUM, Chaffy, as in Rudbeckia. Pl. 11. Fig. 2.
 And these are either,

1. FLORIS, of the Flower, containing the Bases of the
 Flowers which have no Seed, as in the Male Flower of
 Pompion. Pl. 11. Fig. 3.
2. FRUCTUS, of the Fruit, as in the Female Flowers of
 Frogbit. Pl. 11. Fig. 4.
3. FRUCTIFICATIONIS, of the entire Fructification, that
 is, containing the Bases of Male Flowers and Fruits, as
 in China Aster. Pl. 11. Fig. 5.
4. SEMINUM, of the Seeds, the Part to which the Seeds
 adhere within the Capsule, as in Henbane. Pl. 11.
 Fig. 6.

A Receptacle may also be either,

7. PROPRIUM, Single, that is, which contains the Base
 only of one Flower, as Pasqueflower. Pl. 11. Fig. 7.
8. COMMUNE, Comprehending many Flowers, as Globe-
 Thistle. Pl. 11. Fig. 8.
9. PALEA, the Chaff, is a Film separating one Flower from
 another, as in Lepia. Pl. 11. Fig. 9.
10. UMBELLA, an UMBRELLA, a Receptacle continued in
 long Divisions, as in wild Parsnip. Pl. 11. Fig. 10.
 This is either,

11. SIM-



11. *SIMPLEX*, Simple, without Subdivisions, as in Shepherds Needle. Pl. 11. Fig. 11.
12. *COMPOSITA*, Composite, divided at the Summits into lesser Umbrella's, as Fennel. Pl. 11. Fig. 12.
13. *UNIVERSALE*, General, comprehending the first Shoots and Subdivisions, as in Skirret. Pl. 11. Fig. 13.
14. *PARTIALE*, Partial, the small Umbell which rises from the Main-shoot of the larger, as in Honewort. Pl. 11. Fig. 14.
15. *CYMA*, a Tuft, as in Candy Tuft. Pl. 11. Fig. 15.
16. *SPADIX CUM SPATHA*, an Ear and Sheath, as in Palm. Pl. 11. Fig. 16.

A T A B L E of

VARIETIES in the APPEARANCES of PLANTS arising from
LUXURIANT NOURISHMENT; or ACCIDENTS.

HAVING now gone through an examination of all the parts of Plants in their natural state, it remains only that we consider and explain a few of those singular appearances which certain parts assume from accidents, the effect of culture, or natural but abundant Nourishment: not that these are of importance, like the others, in giving the distinctive marks by which one species of Plant is known from another; but merely that they may not by appearing such mislead the Student.

THE principal of these peculiarities regard the Leaves and Flowers of Plants. Those which are seen in Leaves are mostly of the Kitchen-garden products; as the curled Coleworts, and the like: such as are seen in Flowers are the produce of the great attention of the gardner, assisted often by accidents which it is difficult to understand. These

products are the double, and proliferous flowers; to which, though they are the great delicacies of the Florist, Botany allows no better a name than Monsters.

UNDER these two kinds of Flower and Leaf Monsters are contained the great varieties; which may be thus understood.

I. OF FLOWERS.

THE Tulip when in its natural state has a Flower formed of six Petals, and furnished with six Chives: but when Culture sends up more nourishment to it; or when accident produces a Bloom before the Stalk has reached its due heighth, the Chives grow broad and become so many Petals; and after this, splitting flatwise once or more, they form a multitude of inner Petals, and the Tulip becomes DOUBLE. See Pl. 12. Fig. 1. This represents a double Tulip which blowed the last Season, 1759, in the Nursery Garden of Mr. LEE at HAMMERSMITH.

IN the same manner the Rose in its native wildness is single; that is it consists only of one range of petals surrounding a multitude of Chives: but when luxuriant nourishment is given to the Root, these Chives, as in the Tulip, spread out into Petals, in many series: and thus the Rose becomes double, just as that Flower. But that is not the utmost effect of Luxuriance in this Instance; for the Stalk which supports this double Rose may be urged to grow through its centre, and on its top will be produced another Flower like the first; and often a Leaf between them. This is the state which is called PROLIFEROUS. See Pl. 12. Fig. 2. It represents a proliferous Rose which blowed in my Garden at WESTBOURN-GREEN, 1756.

THERE is also a peculiar Monstrosity belonging to the Composite Flowers, as the Daisy, Marygold, and others; which, after they have been rendered perfectly double by the extension of their tubular Floscules in the Centre into flat and long ones like those of the Rim, send out a young Offspring from their Base. This is the species of proliferation which affords the HEN AND CHICKEN DAISY, and the
CHILD-



Double Tulip.



Proliferous Rose.



Rose William.



Chilling Hamkew.



Oak Apple.



Curled Cabbage.



Bubbly Artichoke.

CHILDING MARYGOLD, and HAWKWEED. See Pl. 12. Fig. 3. Which represents a Hawkweed raised to extreme Luxuriance by Mr. PERFECT, Groundworker at POMFRET in YORKSHIRE, 1754.

THE Bites of Insects also will occasion mimic Flowers, and Fruit. The ROSE WILLOW is an Instance of the former; and the Galls familiarly shew the latter. The singular excrescence of the Willow resembling the Flower of a Rose, and thence distinguished by a peculiar name, is figured in Pl. 12. Fig. 4. The old Authors supposed it was a peculiar kind of Willow which bore Roses; but it is a mere accidental excrescence of the common Willow. I saw some hundreds of them a few years since on the Willows about BUGDEN; and this which is here designed from nature, is from a very fair one taken off a Willow near the seat of Sir ROGER HILL of DENHAM.

THE common Galls we use for Ink are excrescences of the Oak, produced in the very same manner as this of the Willow, by the wound of an Insect; and the same tree affords many other kinds. That which is represented, Pl. 12. Fig. 5. is what we call the Oak Apple. It is figured from a very fair one gathered on IVER HEATH in BUCKINGHAMSHIRE.

II. OF LEAVES.

LEAVES in their first Instance of Luxuriance become curled and elevated in waves, and folds and ridges, variously, and often elegantly turned; as in the curled red Cabbage. See Pl. 12. Fig. 6.

In the second or most extreme degree their Surface rises on the Disk in bubbles, as well as at the Edge in waves; and they become then what we call *Folia bullata*; bubbled Leaves. Of this the bubbly Lettuce is an elegant instance. Pl. 12. Fig. 7.

THIS is owing to abundant Culture, and Luxuriant Nourishment: and from these few plain Instances may be understood all that unnatural elegance which Plants assume from Culture.

THUS has the Reader the whole-scheme of vegetable parts.

THESE last are instanced that he may be aware of them as Varieties only, when they occur in a less degree in Nature : on the others are to be founded all the distinctive characters of Plants, classic, generical, and specific, equally. it is according to the distinctions of these, as laid down in the eleven preceding Plates, that the several kinds will be arranged in the succeeding parts of this Work ; and by the terms annexed to those distinctive marks their differences will be explained. But before we advance to the Method which is to be used in this System it will be proper that we examine the Arrangements of others.

B O O K III.

Of the Several ARRANGEMENTS of PLANTS.

C H A P. I.

Of the DIFFERENT SYSTEMS of BOTANIC WRITERS.

TO form a judgment of the possibility of distributing Plants in natural Classes, it is proper to examine particularly the different Systems.

CÆSALPINUS divides Plants into Trees or Shrubs, and Herbs with Under-Shrubs. Trees form two Classes, one whose Seed has the eye on the top, the other on the bottom. The orders are taken mostly from the Fruit, or its situation with regard to the Flower; that is, either under it, or surrounded by it.

HIS first Class of Herbs with single Seeds, takes in most of the Apetalæ of the Moderns, to which he has added Grapes; the next the Bacciferæ, to which he adds the Melon Tribes; the third has those with single Seed-Vessels. The first order holds the Leguminous, the last the Lychnis, Alfine, and Primula Families; with others that do not belong to them. The fourth class is confined to the Umbelliferæ: the fifth with two Seed-Vessels, is made up of different Plants; though the last order with several Seeds comprehends most of the Siliquosæ. The sixth Class with three Seeds or Seed-Vessels is extremely mixed. Of the seventh are the bulbous, to which he has added many of the sheathed Plants. The eighth has those with four naked Seeds. The first order, whose Seed-eye is on the top, contains the rough-leaved Plants; the second with the eye at the bottom, the Ringentes. The ninth and tenth Classes take in the compound Plants: the eleventh has those with several naked Seeds, and is composed of the Ranunculus, Anemone, and most of the Plants which the Moderns have put under that Class; to which he has added some of the Mallows. The twelfth with several Seed-Vessels is the Multifliquæ of the Moderns, and many of them have followed him in adding to this Class, Plants with single Seed-Vessels and several Cells. The thirteenth and last is composed of the Ferns, Mushrooms, and Mosses.

MORISON'S System is disposed into eighteen Classes.

THE four first are Trees, Shrubs, Under-Shrubs, and Climbers; to which last he adds the Melon Family. All the orders are taken from the Fruit.

THE fifth is the Leguminous: the orders are from their habit of climbing or not climbing; and the three-leaved, with what he calls their relations, as Strawberry, Tormentil, &c.

THE sixth is the Siliquose, under which title he puts several of the Multifiliquæ and Multilocares.

THE 7th holds the Bulbosæ, to which he adds some Plants with naked Seeds, as Anemone.

THE 8th is a strange medly of Mallows, Plants with one Seed-Vessel, many pods, and Apetalæ.

THE 9th and 13th take in the compound Plants, though with many improper ones, as Valerian, Pine-Apple, &c.

THE 10th consists of Grasses with several of the sheathed Plants.

THE 12th has the Umbelliferæ joined with the Fillipendula Ulmaria, &c. and most of the Stellatæ

THE 13th, holds the Tricoccæ. Two Plants, the Spurge and Ricompose this Class.

THE 14th, the Galeatæ and Verticillatæ, to which he adds the rough-leaved Plants.

THE 15th has the Multifiliquæ and Multicapfulares, though more properly many celled.

THE 16th, the Bacciferæ, and of those few Plants.

THE 17th, the Capillary.

THE 18th, the Heteroclite, which is a strange medley of all sorts that he could not bring into his former Classes.

THIS Author, therefore who boasted so much of having first formed a System from Nature, owes almost every thing he has that is good to CÆSALPINE, whom he never mentions; but he has by no means kept his Classes so pure as that Author; not having one without some unnatural mixture.

RAY gave the next System; which, though borrowed greatly from the two former, and consequently founded chiefly on the Fruit, yet takes in all the other parts of Plants: this Author has approached nearer to Nature, and followed her also more closely than the generality of later Writers. This method begins with the smallest, and most imperfect Plants, and ends with Trees. He first divides Vegetables into Plants with Under-shrubs, and Trees with Shrubs.

OF the first he has twenty-five Classes, by him called Genera.
The

The imperfect are in four, viz. 1. Submarinæ, 2. Fungi, 3. Musci, and 4. Capillares cum affinibus.

NEXT to these come an inferior Class of Anomalæ, without Flowers; under which are Ophioglossum, Kali, Lens, Palustris, with many of the like.

HE has such another which he calls Tetrapetalæ Anomalæ, after the Siliquosæ, where we find an odd mixture of Papaver, Tithimalus, Plantago, Ruta, &c. and one after the Gramina: here are the Nymphæa, Tribulus, Stratiotes, Hypecoum, Epimedium, Anona, Fumaria, Piper, Thalictrum, Acriviola, &c. These were made up of Plants that would not range under his other Classes; and which he thought unconnected with the rest. DILLENIIUS has formed a new Class out of some of them, by the name of Di, and Tripelatæ, in the Synopsis.

RAY's 5th Class contains the Apetalæ, all well, if we except Plantago and one or two more.

THE 6th, 7th, 8th, and 9th, take in the natural orders of the Compositæ, by the names of Planipetalæ, Lectescentes, Discoidæ Semine Papposæ, Corymbiferæ; Fl. Discoide non Papposæ, and Capitatæ.

THE 10th, Semine Nudo Solitario, is mixed, though VALLERIAN and LIMONIUM follow well the Globularia of the last. But he puts Agrimony here, which has two Seeds.

THE 11th, UMBELLIFERÆ, these are kept perfectly pure.

THE 12th, STELLATÆ, these are most naturally combined, as well as,

THE 13th, the Asperifoliæ.

THE 14th, VERTICILLATÆ also are excellent.

THE 15th, SEMINE NUDO POLYSPERMÆ, are the Ranunculus, Anemonies, &c. very good; so are

THE 16th, POMIFERÆ, the Melons, &c. These also are followed well by

The 17th, which has many of the Bacciferæ, as Bryonia, Smilax, Mandragora, Solanum, &c. though I must own there are several others improperly placed there; as Vitis Idæa, Convallaria, Christaphoriana &c.

THE 18th, the Mutifiliquæ, are all well if we except the Apocynum, Aselepias, and Vinca; but this Class would more naturally have followed his fifteenth.

THE 19th VACULIFERÆ would have done better next the Bacciferæ, if we regard the first order of HYOSCIAMUS, NICOTIANA, &c. but if the two last which contain our Ringentes, Vasculiferæ, &c. it had been better joined to the Verticillatæ. There are in this Class several natural orders, though not connected with one another. In one of them he has oddly placed the Mallows, and joins with them the Oxalis, which is certainly related to them, but I cannot say so much of the Greek Valerian. He puts the Polygala with the Ringentes, though it is properly one of the Leguminosæ; and the Aristolochia that is a Plant sui Generis.

THE orders are all taken from the shape or figure of the Flower.

THE 20th, the Tetrapetalæ Siliquosæ and Siliculosæ are extremely well, and perfectly chaste.

THE 21st, the Leguminosæ are the same.

THE 22d, the Pentapetalæ Vasculiferæ are mostly well; containing the Caryophyllacei, the Alsinæ, Hypericums, Saxifragas, Geraniums, &c. The last order has no business here; containing Viola Reseda and Impatiens. DILLENIVS has formed another Class here of some of the Anomalæ; as Lythrum, Nymphæa, Peplis, calling them Polypetalæ.

THE 23d, holds the Bulbosæ and Affines, all perfectly well: the Affines are the Orchidæ and several of those Plants which will be found under the term Spathacei in our succeeding natural method; only Cyclamen seems improper among them.

THE 24th, are the Gramina.

I CANNOT commend his Classes of Trees.

THE 25th, Arundinaceæ or Palmæ.

THE 26th, Apetalæ, where he has mixed the Ruscus and Empe-trum with otherwise a good Class of the Amentacei.

THE 28th, FRUCTU Umblicato, and non Umblicato. The Plants in these two Classes are greatly (and some terribly) separated; the Pyrus, Mespilus, Rosa, Ribes, &c. are placed together in one, though they differ greatly; Prunus Cerasus, Padus, in the other.

THE 29th, ARBORES FRUCTU Sicco has only the Acer and Fraxinus in the first order; the last are extremely mixed.

THE 30th, SILIQUOSÆ seem well; he keeps by themselves the Cassia, Tamarindus, &c. that have not a papilionaceous Flower

THE 31st is reserved for the Ficus.

As

As I affirm this Author to have followed Nature more than any other, it will be worth while to shew in a few words, his faults as they appear to me, and his superior merit. Here I must observe, in general, that though he has made natural Classes, he did not take sufficient pains to join them naturally: his System prevented that in some; but others might easily have been better ranged together.

His nine first Classes seem all good, the 5th is mixed a little, and so is the 11th, and the five following. Most part of the 18th is very well, the 20th and 21st are excellent, the 23d and 24th very well. There remain only for the much mixed Classes the 10th, 17th, and 19th; and even in these there are excellent orders.

THE Bacciferous appears to be one of the worst: two Classes of his Trees are good, and the two last, though with a few improper Plants. LINNÆUS thinks fit to allow him but twelve natural Classes; the rest he calls extremely mixed: but is this fair? Shall two or three improper Plants make us condemn an otherwise natural order? Let it be said to this worthy Man's praise, that wherever the best Authors have attempted natural Classes, they plainly follow his footsteps, tho' they have not ingenuity enough to own it. I am sure the more I study the Book of Nature, the higher opinion I conceive of RAY. His fault was tying himself down too rigidly to a system, which separated his Classes. It were well if succeeding Authors erred only this way; but they, as we shall soon see, flounced, deeper: many not only separated their Classes, but their Genuses too. True it is, that RAY's Genuses and Species are not sufficiently described: this task was reserved for that excellent Botanist LINNÆUS; and is his master-piece. Yet I must express a wish, that in his specific descriptions he had followed a little more our worthy Countryman. LINNÆUS's conciseness is productive of as much confusion as RAY's prolixity. I am sorry to be forced to own before I quit this learned Man, that he did not sufficiently acknowledge the assistance he had from MORRISON. We may easily trace in him many of that Author's Classes, though greatly improved. It would in no wise have lessened his merit to have named his Author; and, though perhaps MORRISON complained with too much virulence; it was not without foundation. But these are trifling imperfections, to

which the best of Men are subject; let them be forgot: and as I have pointed both the good and the bad of this Author, it will not be difficult to avoid the one, whilst we reap the fruit of his labours by carefully examining the other.

HERMAN's method was published by one of his Scholars in 1690, and is taken solely from the Fruit. It is entirely artificial; Nature is little attended to, except in the natural Classes, kept by most authors. The others are formed of many various Plants; and as it is chiefly compiled from CÆSALPINUS and MORRISON, it will be unnecessary to dwell longer upon it.

RIVINUS was cotemporary with RAY and HERMAN: he had very bitter disputes with the former about his System, which RAY very properly condemned. This Author is remarkable for having dropped the distinction between Trees, &c. and Herbs: he also mixes the Apetalæ amongst the rest. He divides Plants into perfect and imperfect: the first into simple and compound, the simple into regular and irregular; the regular form seven Classes, viz. the 1, 2, 3, 4, 5, 6, and many Petal'd: the irregular the same. Of the compound he has regular and irregular; and regular and irregular mixed. The imperfect make the 18th Class. His orders are taken from the Fruit. He has not one pure Class; for though he keeps many of the Pants together that form the best natural Classes, as the Umbeliferæ, Compositæ, Ringentes, &c.; they have very improper ones joined to them. The following instances prove this assertion.

In the regular, Tetrapetalous in the midst of the Siliquosæ, are placed Potamogiton, Clematis, Epimedium, &c. and there are added Euonymus, Laurus, Vaccinium. To his regular compound Class is added Nymphæa: to his regular and irregular, Granadilla, Nigella, Helleborus, &c. His irregular compound are the best, but far from well. In his irregular Monopetalous, with the Ringentes are Lobelia, Aristolochia, Lantana, Lonicera, Arum, &c. With the Leguminosæ: in the regular Tetrapetalous appear Iberis, Cardispermum, Impatiens, Euphorbia, &c. Joined to the Umbelliferæ in the irregular Pentapetalous are Tropæolum, Geranium, Cassia, and
several

several of the Multifloræ. In the imperfect, you find *Equisetum* and *Ricinus*: in the middle of the Amentaceæ, *Ficus*, with *Triticum*, &c. In the second Class there is only the *Circæa*; in the 12th, two Malabar Plants; in the 13 and 17th none. This, with the coining many new names, is all very bad; but nothing to the confusion that arises in the Genera from this distribution; many of which are terribly broke and divided; those preserved, it is no great matter how an artificial System is formed: it is an Index, and little more. However, this has had many admirers, among whom *RUPPIUS*, *KNAUT*, and *LUDWIG* have corrected and embellished it much: the last has kept the Class of the *Apetalæ*, but calls it by the strange name of *Dubii*. This Author published, in 1747, a new method, wherein most of *RIVINUS*'s Classes are kept: he there calls this Class *Apetalæ*: he makes no distinction between the regular and irregular, in the *Diapetalous*, *Tripetalous*, and *Hexapetalous*; but adds two new Classes from those unnatural ones, the *Monæciæ* and *Diæciæ* of *LINNÆUS*; which he calls *Relativæ Mono*, and *Diphytæ*. His orders are taken from the *Chives* and *Pointal*. His generical descriptions are good, but generally borrowed from *LINNÆUS*; so are many of his names. Upon the whole, many of the natural Classes are pure; but yet the foundation of this method will not admit of any approach to Nature.

TOURNEFORT was another competitor of *RAY*'s, and one of the most accurate Botanists of the age: he examined more Plants than most people had done before him, or have indeed ever been able to do since. He studied Nature, yet preferred the arbitrary Laws of a favourite System; so that notwithstanding he has many classes tolerably natural, his orders are often excellent, and the Plants well ranged under them, it still must pass for an arbitrary method. His distinctions of the shapes of Flowers render it also very difficult. His generical descriptions, though not perfect, are rendered tolerable by his Figures; and indeed before him we had hardly any to be depended on. His System consists of twenty-two Classes: he divides all into Herbs and Trees; the former into *Petalous* or *Apetalous*; the *Petalous* into simple and compound; the simple into *Monopetalous* and *Polipetalous*, and each of these into regular and irregular. His orders

orders are taken from the Fruit, and what he calls the Pointal, or Cup going into Fruit, which answers to the Fruit, being above the Cup or below it.

HIS 1st Class, *Campaniformes*, contains some good orders, but not connected with one another, as the Mallows, *Cucurbitaceæ* and *Stellatæ*. Part of our *Folliculaciæ* militate here; others in the next; *Campanula* and *Ranunculus* are placed with the *Stellatæ*; and there are several Species here that by no means suit his classical character. The other orders are extremely mixed.

2d, *INFUNDIBULIFORMES*, of these the *Primulæ* are tolerably well, and several of the *Solanacei* of our natural method; some are in the last Class. The *Ipomæa* and *Trachelium* are totally separated; many of their companions are in the *Campiformes*. *Mirabilis*, *Verbascum*, and *Hyosciamus* are divided; and several of their Relations, as *Mandragora*, &c. are placed among the *Campaniformes*. The *Crucianella* is placed here, instead of being with the *Stellatæ*. The purest order contains the rough-leaved Plants, tho' one of them, *Cerithe*, is in the last Class. Upon the whole, these two Classes are extremely mixed, and yet by selecting Plants out of each several natural orders might be made.

3d, *MONOPETALI ANOMALI*, if it were not for two or three small orders, with *Arum*, *Aristolochia*, *Tithimalus*, &c. this would be an excellent Class; though with a wretched title. It contains the capsulated *Ringentes* of our natural method.

4th, *LABIATI*; this is excellent, consisting of the naked *Ringentes*. They are ill placed but none improper.

5th, *CRUCIFORMES*; this is also extremely well; though in the latter orders he has thrust in *Hypecoum*, *Chelidonium*, *Epimedium*, *Potomageton*, and *Paris*.

6th, *ROSACEI* the first order of this long Class contains the *Amaranthus* and *Portulaca*: the five next are composed of the *Multifloræ*, and *Quinque-loculares*, as the *Alfines*, *Sedums*, &c. but extremely mixed: then follow the *Gymnopolyspermæ*, *Anemones*, &c. and the next order contains several *Baccifera*, as *Asparagus*, *Smilax*, &c. The two last are mixed, tho' with less impropriety.

7th, *THE Umbelliferæ*, very well, though I dislike the *Eryngium* with them.

8th, *THE*

8th, THE Caryophyllacei; this is very short, and joins to the Lychnis's, Linum, and Statice.

9th, LILLEACEI; this Class is very good: I think the Monopetali answer better to his Campaniformes, though he did right in keeping them with their companions.

10th, PAPILIONACEOUS, very pure.

11th, POLYPETALI ANOMALI; this is extremely mixed: it begins with Viola, Balsamine, and Fumaria: then follow ten or twelve of the Multifiliquæ, to which he adds Polygala; and the last order takes in the Orchidea, ending with the Musa.

12th, 13th, 14th, THE three Classes of the Compositi, Flosculosi; and Semiflosculosi are very natural; though perhaps these divisions do not always hold good.

15th, APETALI; in the middle of the common apetalous Plants he places the Gramina.

16th, FLORE CARENTES; these are the Ferns, to which he adds Lichen.

17th, FLORE ET FRUCTU CARENTES; take in the Musci and Algæ.

T R E E S.

18th, APETALE.

19th, AMENTACEÆ.

20th, MONOPETALÆ.

21st, ROSACEÆ.

22d, PAPILIONACEÆ.

THE Trees are extremely mixed, except the 19th Class and the last; some of the 18th belonging to the Amentaceæ: as for the rest, they have no other connection than in the titles of the Classes.

PONTEDERUS and some others followed; who joined TOURNEFORT and RIVINUS.

BOERHAAVE, in 1720, published a System, in which, tho' mostly founded on HERMAN'S method of the Fruit, yet he follows TOURNEFORT and RAY in many other things; so that is considered as a sort of weaving of these three Systems. His Classes of Shrubs are almost all defined from the Fruit, which prevents his approach-

ing Nature so nearly as Ray has done : however, in some things, he excelled all that went before him ; as in his generical characters, which, though taken from *TOURNEFORT*'s are greatly preferable ; for he makes use of more parts of the Fructification in his descriptions. He also first examined the number and disposition of the Chives. He divides his System into Herbs and Trees ; yet wherever he found Trees naturally connected with Herbs, as in the Leguminosæ, Triocceæ, &c. he avoided separating them. An excellent method, and almost peculiar to himself. He begins, like *RAY*, with the imperfect Plants, and then divides, with him, both Herbs and Trees into Monocotyledones and Dicotyledones.

His 1st, 2d, 3d, are three Classes of imperfect Plants : Submarinæ Terrestres, and Capillares.

4th, *THE Gymnopolyspermæ*, the *Anemone* tribe, a very natural Class.

5th, *GYMNODISPERMÆ*, the *Umbelliferæ*, very pure.

6th, *GYMNOMONOSPERMÆ SIMPLICES*, a short Class of the *Valerians*, *Agrimony*, and other *Coronatæ*, that seem well placed after the *Umbelliferæ* ; though I cannot say all are well connected here.

7th, 8th, 9th, 10th, *THE Gymnomonospermæ Compositæ* are divided into four Classes ; *Planipetalæ*, *Discifloræ Radiata*, *Discifloræ Nudæ*, *Capitatæ*. These are perfectly pure, tho' some Species of his *Discifloræ* will be radiated, others naked in the same Genus.

11th, *GYMNODISPERMÆ STELLATÆ*. This natural short Class should have followed the *Umbelliferæ* with the *Coronatæ*.

12th, *GYMNOTETRASPERMÆ VERTICILLATÆ*, the *Ringentes* very pure. So is the

13th, *GYMNOTETRASPERMÆ ASPERIFOLIÆ*.

14th, *GYMNOTETRASPERMÆ TETRAPETALÆ*. This contains only the *Potamageton*.

15th, *MONANGIÆ*, composed of two good orders, the *Primula* and *Lichynis*'s.

16th, *DIANGIÆ* ; this begins with *Lythrum* and *Saxifrage*, followed by the rest of our *Ringentes Capitulatæ*.

17th, *TRIANGIÆ* ; the first order mixed with many *Campanacæ* and *Quinqueloculares*, as *Hypericum*, and *Parnassia* ; and some *Multifiliquæ*, as *Reseda* : the others are *Tricocceæ*, to which he adds *Cardiaspermum*.

18th, *TE-*

18th, TETRANGIÆ contains only Ruta, Peganum, and Stramonium.

19th, PENTANGIÆ, the Geranii.

20th, POLYANGIÆ, are mixed; as the Mallows, with Nymphæa, &c. Nigella, and some of its Relations, with Cistus.

21st, MULTISILIQUÆ is very well, and follows naturally the end of the last Class.

22d, SILIQUOSÆ, extremely mixed, taking in all filiquous Plants that have not cross-shaped Flowers, as Chelidonium, Fumaria, Apocynum, Zygophyllum, &c. but the third order is very good, containing those Plants distinguished by two Follicles, which in our succeeding natural method we shall call the Bifolliculares.

23d, TETRAPETALÆ CRUCIFORMES, very pure.

24th, LEGUMINOSÆ, very good, though some of the last orders with separate Chives, should not be placed with the rest in a natural method.

25th, BACCIFERÆ; this is like RAY's, containing several related Plants, and many unconnected.

26th, POMIFERÆ; this would have followed well the last Class, if he had ended with the Bryonia, &c. It consists of the Cucurbitacæ, though he adds Cactus and Bromelia.

27th, APETALÆ; generally very well.

28th, MONOCOTYLEDONES BRACTEATÆ; this Class also is well, though I do not approve of his orders: he joins many of our Spatheacæ and Orchidæ to the Bulbosæ.

29th, MONOCOTYLEDONES APETALÆ, the Gramina and but few of them.

ARBORES.

30th, MONOCOTYLEDONES, the Palmæ with Musa.

31st, APETALÆ.

32d, AMENTACEÆ.

33d, MONOPETALÆ.

34th, ROSACEÆ.

He ranges his Trees pretty much like Tournifort; the 30th and 32d Classes are good; all the rest are greatly mixed, though his orders are purer: thus in his last class, his 6th and 7th orders contain almost

almost all the Fruit Trees of our natural Classes the Coronatæ and Calycanthæ, very well.

MAGNOL published his System at the same time with BOERHAAVE: and it is totally different from all that went before him. He takes his classical characters from the Cup: and as some Plants have none, and yet his System makes one absolutely necessary, he has established three great divisions.

1st, AN external Cup only, which is the true one, and answers to the Gymnopolyspermæ.

2dly, AN internal Cup only; this is really the Capsula; so it takes in the Angiospermæ without Cups, such as the Liliaceæ.

3dly, EXTERNAL and internal together; this comprehends the rest of the Angiospermæ. He takes his orders from Cup, Flower, and Fruit, but chiefly from the Flower. We shall very slightly examine his System, by which its merit will easily appear.

1st CLASS, Calice Externo, Flore Ignoto. A very few Algæ, Ferns and Mosses.

2d, CALICE Externo, Fl. Stamineo. A few Apetalæ and Gramina.

3d, CALICE Externo includente Florem Monopetalum. This is no bad Class; it begins the Asperifoliæ, and ends with the Ringentes Nudæ.

4th, ----- Florem Polypetalum. A few of the Gymnopolyspermæ with Urtica, Kali, &c.

5th, ----- Florem Conpositum, he here takes TOURNEFORT's Radiatæ, Flore Flosculari et Semiflosculari Simul, this is very well: but he joins Valerian, Scabious, Eryngium, Statice, &c.

6th, CALICE Externo Sustinente Florem Monopetalum. The Stellatæ, with many other different Plants, as the Lapatha, Sanguisorbæ, &c.

7th, ----- Florem Polypetalum. Umbelliferæ; very well, if he had not joined Anemone, Pulsatilla, and Clematis.

8th, CALICE solum Interno; the two first orders contain the Liliaceæ, and some of the Orchidæ; the last a strange medley of Baciferæ, Tricocæ, and Multifiliquæ.

9th, CALICE Externo et Interno Monopetalæ. The three first orders of this Class do tolerably; they contain the Solanacæ, Cucurbitacæ, many of the Campanacæ, Primulæ, &c. The fifth has
the

the Mallows, with some Bifolliculares added. The sixth, many of the Ringentes Angiospermæ.

10th, CALICE Externo & Interno, Di vel Tripetalæ. Only Cir-cæa and Tradescantia.

11th, ----- Tetrapetalæ. The Siliquosæ would be very well here, if they had not been preceded by Paris, Capparis, and Ruta; and followed by Hypecoum, Epilobium, &c.

12th, ----- Polypetalæ. The three first orders contain many of the Quinque-loculares, Multifliquæ, Alfines, and Lychnis's: the last are the Leguminosæ.

13th, ARBORES Calice Externo; mostly amentaceous.

14th, ----- Interno; mixed.

15th, ----- Externo & Interno; immensely mixed.

LINNÆUS, in 1737, was the next Author who produced a System. He has given us one from the Cup improved from MAGNOL: where the shape, situation, and segments of it form the Classes, and many of the orders. But as in treating of the parts of Fructification all his distinctions have been explained, it will be needless to run over this System at present. The Author himself allows it to be entirely artificial. I must however observe, that ROYEN, whose method we shall soon examine, has taken from it three Classes, viz. Palmæ, Calycifloræ, and Coronatrices.

WE have now seen methods of ranging Plants taken from the Seeds, from the number of Petals or Segments in the Flower, and from the Cup. Some of these also have been combined: and yet amongst them all RAY's only approaches to Nature. The parts of Fructification yet remaining are the Chives and Pointal: these LINNÆUS has made use of, to form his Sexual System. He allows no distinction between Trees and Herbs; his Classes are taken from the number of Chives; and his Orders from the Pointal. Had he stopped here, his System would have had few admirers; for it is very artificial, and subject to uncertainty from the varying of the number of Chives, and even of Sex in the same Genera. It demands also great attention; and in small Flowers, magnifying Glasses. Some Classes are terribly torn asunder, and others strangely mixed. But his great and well merited Reputation does not proceed from his System: he certainly

has advanced the study of Botany more in a few years, than many Ages had done before. He had great assistance from those who preceded him: but besides many things peculiar to himself, the very distribution of the old materials, and making use of them as he has done, shews that superior Genius which, in spite of some imperfections, forces our admiration, and commands our praise.

HIS CRITICA BOTANICA lays down many excellent rules for the distributing Plants into their true Classes, Genera, and Species; and for characterizing properly each of these divisions. Many are the rules also relating to the names of Plants; but these I cannot equally commend: some indeed are unexceptionable, but others trifling and unnecessary; yet in consequence of them, how many alterations has he made? How has he, instead of diminishing, added to the incertitude of that disagreeable part of Botany? Why are all names given Plants by unskilful people, taken from Gods, or not Greek and Latin, to be rejected? How trifling are his reasons! and how much more weighty are the objections to be made to some of his innovations! as where the Greek and Latin names, having the same sense, are given to two distinct Genera; where the Greek and Latin names of particular Plants are taken from them and applied to new or very different Genera. What an inundation of Swedish names has he brought into Botany; unknown, unheard of out of their own country, perhaps out of their province; while he rejects others that have been given out of respect to great and eminent men! Why, for example, must CATESBY's *Meadia* be called *Dodecatheon*. Few men were better known than Dr. MEAD; few patronized Learning more, and Botany in particular. The truth is, many of these rules were very proper for the infancy of Botany; but such great alterations, in things established by long custom, are ever attended with confusion; nor ought to be attempted without the most pressing necessity; which is far from being generally the case. We formerly took notice of BOERHAAVE's having much improved TOURNEFORT's generical characters; LINNÆUS, by taking in the whole Fructification, has established them. His characters were the first to be depended on: all was uncertainty before. They are general, and may be adapted to all Systems; new discovered Genera can only add to them; new Species will not alter them.

HERE

HERE then is one immense improvement: the following, his distinction of Species, is fully equal to it; but with this remarkable difference, that here our Author had no assistance; for no writer before him gave a true specific character. The different colours of Flowers, the Country the Plants came from, as *Dictamnus Montis Sypili*; the names of their first discoverers, as *Samolus Valerandi*; the situation they were found in, as *Eryngium Montanum*, &c. the vague words of Major, Minor, &c. as *Centaurium majus* and *minus*, were the only terms made use of to describe the Species. *Bauhine*, *Ray*, and older writers gave indeed long descriptions in their natural Histories of each Plant; but these cannot be called specific characters: *Linnaeus* alone has the honour of first framing them; and they are made with great penetration: I cannot say they are equal to his Genera, the thing will not admit of it; a new Species will often make some alteration in those described before: besides, who has seen all the species he describes? much must be taken on trust, and we are often led into error by very able men.

I INDEED with that *Linnaeus* had joined a short account of the habit and manner of growing, place of the Flowers, &c. of each Species; two or three Lines would have been sufficient, and it was the more necessary, as he has mixed Trees and Herbs. However, in his new *Species Plantarum*, he adds a mark to distinguish annual, perennial, and shrubby Plants.

Plumier has been equally remiss; and neither *Boerhaave* nor *Tournefort* have given us a description of the Habits of Plants.

IF to all these improvements of *Linnaeus* we add the many new parts of Vegetables he has described, (for I must call those so that no one formerly regarded) as the Nectarium, the Stigma, the Conceptaculum; the fixing a determined sense to the terms Valves, Cells, and many other parts of the Fructification, that were hardly ever used to signify the same thing before him; the accurate divisions of the Buds, Leaves, Branches, &c. I say, if all these, and many more excellent things that occur in his numerous Volumes are examined, we shall not be thought to neglect the living or do injustice to the dead

dead, by affirming him to be the greatest Botanist that ever any age produced. Should I, after what has been said, treat his System with great freedom, let me not be suspected of any desire to lessen his fame, I have myself assisted to establish it: whatever fate attends the one, the other will remain while Botany is cultivated: he does not pretend it as a natural method, I cannot commend it as an artificial one; for innumerable are the exceptions to his classical characters, &c. I shall not examine it minutely, nor take notice of every Plant that disagrees with the title it stands under; some few general observations will be sufficient. His best Classes are these:

DIDYNAMIA, where *Melanthus* is the only Plant unnaturally placed: but then there are those wanting, that are in this *Diandria*, which quite ruins this natural class.

TETRADYNAMIA. The *Siliquosæ*; are pure, if we except *Cleome*. So are

MONADELPHIA. The *MALVACEÆ*; as also the

DIADELPHIA, or *Papilionacæ*; and the

SYNGENESIA; the last order excepted. But then his method of dividing this last Class, according to the Sex, is terrible. In the *Polygamia Superflua*, there are Species of the *Gnaphalium*, that belong to the *Polygamia Æqualis*, others that belong to his Class of *Dioicia*: and of the *Tussilago*, some Species are *Androgynea*. But indeed, nothing renders this System so unnatural, or so uncertain, as the dividing the Plants into Sexes; which will appear more hereafter.

ICOSANDRIA seem pretty natural.

GYNANDRIA: The first order of this Class, containing our *ORCHIDEA*, is very well: but the others render it artificial. Of the remaining Classes. The

MONANDRIA contain some of the *Spathacæ*.

TRIANDRIA are a mixture of the *Bulbosæ*, *Tricoccæ*, *Coronatæ*, *Gramina*, &c. and the *Valerians* there have an equal Right to four or five different Classes. The

TETRANDRIA have some of the *Aggregatæ*, *Stellatæ*, &c. In the

PENTANDRIA, are the *Asperifoliæ*, *Primulæ*, many of the *Campanulæ*, and all our *Bifolicales*; with many other different Plants: and amongst the rest the *Umbelliferæ*, which natural order will also

show

show the impropriety of his sexual method ; for numbers of them, especially those with large and thick Seeds, belong to his Polygamia. Why should I mention the *Lapathums*, *Atriplex*, *Rhamnus*, *Laurus*, *Amaranthus*, *Blitum*, *Carex*, *Lychnis*, *Papaia*, &c. that have all Species with Flowers of different Sexes ? *Bryonies* are *Monœcia*, *Dioœcia*, *Androgynœ* ; and some *Veratrum*s are of both Sexes. The

HEXANDRIA contain many of the *Bulbosæ*, with others. In the

DECANDRIA are mixed the *Alfines* and *Lychnis*'s. In the

POLYANDRIA are a few of the *Multifiliquæ* ; in short, the *Cucurbitaceæ*, *Apetalæ*, *Gramina*, *Amentaceæ*, *Tricoccæ*, are cruelly divided, many are in his *Diociæ*, *Moneciæ*, *Polygamia*. In the first of these are several Genus's with hermaphrodite Species, as *Fraxinus*, *Urtica*, *Salix*, *Aruncus*, *Spinachia*. How many more Species have I omitted, that belong to other Classes, rather than those they rank under ? Upon the whole, he has not kept the natural orders near so pure as *RAY* and *BOERHAAVE*, and many are totally destroyed. But waving that, and taking it only in the light of an artificial System, the innumerable exceptions we meet with in Plants differing from their Classes, renders it, in my opinion, very intricate and very uncertain. But still he has great merit, even here ; as in the excellent whole characteristics of the *Compositæ*, *Papilionaceæ*, *Siliquosæ*, *Malvaceæ*, and the *Orchidææ*, which are formed to continue lasting marks of these natural Families ; and, indeed, I may say as much of the *Ringentes* if we add the two-chive Plants to his *Tetradynamia*. To this and his characters we must attribute the astonishing Success his System has had : in spite of all the prejudice, the envy and malice of its opposers, in spite of all its faults, many eminent Botanists have received it, and all have new modelled their Systems by this Author's observations : if some correct him, they are manifestly assisted by the weapons he himself has provided for them.

THE two remaining methods we shall now examine, are built upon his foundations. The first is *ROYEN*'s, printed in 1740. He has laudably endeavoured to keep the natural Classes together as much as possible ; and for that reason, many of his Plants differ from their classical character. Far from blaming him in this, I wish he had

made free with more ; but I find great fault with his taking no manner of notice of it himself. He has given us only the Species ; and refers to LINNÆUS for the description of the Genera : how, therefore, is it possible to discover where he has placed any of these Plants that do not agree to the character of their Class ? This is a great defect ; but we must not be too severe : for except the distribution of some of the Classes and Orders produced from his own observations, his specific characters are generally LINNÆUS's and though he talks of having examined them, he has servilely copied them with all their faults. Some of these, his master (by altering them) has since acknowledged. He has taken, very properly, the characters of his great divisions from all parts of the Fructification: his orders depend chiefly on the Flower. As this method was only intended for the LEYDEN Plants, numbers are wanting in it ; some of which would have much distressed his System. GNELIN is encreasing this System with the Plants of SIBERIA.

ROYEN distinguishes Plants into Monocotyledones and Dicotyledones.

MONOCOTYLEDONES, his first Class, contains the

PALMÆ, which, as I said before, is in LINNÆUS's methodus Calycina. I own I think it, if not natural, yet made up of many good and natural orders ; which, however, he has sometimes disturbed.

LILLIA makes the second ; this also is a good Class ; tho' perhaps it would have been better without the last order.

GRAMINEÆ, very pure.

AMENTACEÆ, as also this : tho' I should scruple to place here Xanthium, Ambrosia, and Parthenium : they differ too much in habit from the rest, notwithstanding their Amentum. Hitherto the Classes have followed one another very properly, but I cannot say so of the

UMBELLIFERÆ, though it is an excellent order.

COMPOSITÆ, the Compound, well placed, and unexceptionable.

AGGREGATÆ, are highly proper : not that I approve however of all the Plants ; as Dorstenia, &c.

TRICOCCÆ ; this has no connection with the last. It is very well : but several of the Plants do not suit the character.

INCOMPLETEÆ ; here are many Plants of the Apetalæ well placed ; others very improperly occasioned indeed by his mixing the Trees.

FRUCTI-

FRUCTIFLORÆ; this is the Coronatrices of LINNÆUS's methodus Calycina. It is by no means a bad Class, though it follows ill the last. The Campanulæ are very improper here; they belong to another of his Classes, though the character of that would not admit them. Cliffortia and Aristolochia are ill placed; and Linnæa is a Ringens.

CALYCIFLORÆ; this is the Floribundæ of LINNÆUS, and comes properly after the last: for the female Plants of the Cucurbitacæ that form the first order here, belong to the Fructifloræ. The second, third, and fourth orders are taken from the Icosandria of LINNÆUS, and agree well together; but have nothing to do with the first or last order, which takes in the Cactus, Pereskia and Mesembryanthemum.

RINGENTES; this Class is excellent, but has no affinity with any near it.

SILIQUOSÆ; this is precisely in the same case, and so are the COLUMNIFERÆ, the Malvacæ.

LEGUMINOSÆ, and this natural Class. None of these, as they are placed, have the least connection with one another.

OLIGANTHERÆ. Now we come to the three mixed Classes of this Author; in which are excellent orders interspersed with others, containing very different Plants. Here is certainly an improvement on LINNÆUS, who, by keeping to the number of Chives, separated Plants strangely. ROYEN saw that their proportion to the number of Petals or of Segments in the Monopetalæ, would be more favourable to Nature: accordingly he put into this Class all Plants, whose Petals or Segments equal or exceed the number of their Chives. So that we have here many of LINNÆUS's first five Classes, but chiefly his fifth; the Asperifoliæ are kept pure in the fourth order; our Bifolliculares in the fifth; in the sixth are many of the Primulæ, tho' with a mixture of foreign Plants, as Amaranthus, Parnassia, &c. in the seventh are several of the Solanacæ, and next them some of the Campanulæ; others are in his Fructifloræ. The rest of this order, with the two last, are mixed.

DIPLOSANTHERÆ; this Class comprehends all those Plants whose Chives exceed, as far as a double proportion, their Petals; and takes in most of LINNÆUS's oct. dec. and dodecandrias. The first order has the Arbutus, and its associates; the second and third, the Lychnis's, Alsinæ, and some few of the Multifloræ; all very tolerably. The last order is composed chiefly of Trees. The Poly-antheræ is the same with LINNÆUS's Polyandria; and, like that, has a great mixture of Plants, though the Multifloræ stand well together.

CRYPTANTHERÆ take in a few of the Filices, Musci, Algæ, and Fungi.

LASTLY, the LITHOPHYTA the stony Plants.

THIS is the disposition of ROYEN. Let us sum up in a few words our opinion of it. He has got together many natural Classes, and in his mixed ones are several good orders; but in doing this, he has not so much followed Nature as other men's observations; from hence proceed his faults. He has little studied to connect one Class with another: his orders, and his Genus's are too often liable to the same defect. The numerous exceptions to his general characters have been mentioned before.

HALLER writ about the same time, though his work did not appear till a year after. Many of his Classes are the same with RAY's but finished in a very different manner, with great knowledge and a vast store of natural observations. His method is not general, any more than ROYEN's, but confined to the Plants of SWITZERLAND. I cannot approve of the length of some of his Classes: for there are two, the Apetalæ and Isoetemes, that include almost half his Genera; and we shall multiply his Classes too much, by giving that name to his orders. Besides, they often contain but one or two Plants. All this will better appear on examining his System.

1st, His first Class contains Plantæ Floribus destitutæ; these are the Algæ and Fungi.

2^d, THEN those Flore aliquo donatæ; under which are the Musci and Filices.

3^d, APETALÆ; this begins with the Amentacæ. The first Plant is Ephedra, following well the Equisetum of the last Class: his next great order is the Non Juliferæ Isoetemes, which negative character

character I am not fond of. Then the *Meiostemones diplostemones*, and *Polystemones*: these all contain the *Apetalæ* of Authors, with many Trees and several of the old *Bacciferæ*.

In the next order are the *Aquaticæ*, placed well before the *Gramina*, that ought to have formed a Class by themselves. The last order is the *Graminibus adfines*, as the *Carex*, *Juncus*, *Typha*, ending with *Arum*. The

4th, *PETALODÆ MONOCOTYLEDONES*; the first great order comprehends the *Orchidæ*; the next the *Liliacæ*. Then follows the second great division of the *Petalodæ*, the *Dicotyledones*, beginning,

5th, WITH the *POLYSTEMONES*.

THIS Class is divided into *Multifiliquæ*, *Gymnopolyspermæ*, *Calicanthemæ*, *Pomiferæ*, *Multiloculares*, and *Malvæ*. All here are put well together, though with many Exceptions. The *Multifiliquæ* in particular have all our *Pileati*. Numbers of them, however, do not suit the classical character: but HALLER freely prefers Nature to the arbitrary laws of his own System.

6th, *DIPLOSTEMONES* is joined to the last extremely well, by *Oxys* and *Geranium*, which begin the Class, followed by the *Lychnis's* *Alfines*, and *Bicornes*; though betwixt these two there are *Agri-monia*, *Epilobium*, *Ruta*, &c. much better else where. He ends this with *Acer*, which has no connection with the rest, tho' it joins well to *Staphyllodendron*, the first Plant of the

7th CLASS, *ISOSTEMONES*; which Class is divided into, 1. *Coronataæ*, where we see *Staphyllodendron*, *Euonymus*, and *Berberis*, placed before the *Umbelliferæ*; to these are more properly added the *Circææ*, the *Tetrapetaloides* or *Stellatæ*, and the *Quinquifidæ*; as *Oculus*, *Viburnum*, &c.

The second great order are *Flore circa Fructum Posito*; comprehending the *Primulæ*, *Campanulæ*, *Solanacæ*, *Asperifolia*, and our *Bifolliculares*; as in ROYER's *Oligantheræ*, but digested in a much more enatural manner. *

8th, *MEIOSTEMONES*; there are only two Plants put under this title, *Ligustrum* and *Veronica*, I am surpris'd he chose to separate them from the *Isostemones*, though they have fewer Chives than *Petal-segments*.

9th, *STAMINA AD PETALA SÆCQUALTERA*; these are the *SILI-*

10th, STAMINA AD PETALA DUPLO SESQUITERTIA; the Leguminosæ beginning with Astragalus, and ending with Polygala and Fumaria, which he calls Papilionaceis affines: followed very naturally by the

11th, STAMINA QUATUOR INEQUALES, or our Ringentes Capitulatæ; though the first Plant, Monkia, has but three Chives, and does not seem to belong to this natural order.

12th, FLORES UNI SEMINI INSIDENTES, AGGREGATÆ; this Class comprehends all the Aggregatæ and Compositæ. It is divided into six great Orders. The

1st PLACENTA COMMUNI NULLA; here he places only Valerian: which perhaps would have come better with Circæa and the Stellatæ.

2d, ARE the STAMINA LIBERA, or our AGGREGATÆ.

3d, THE CAPITATÆ.

4th, THE CORYMBIFERÆ.

5th THE RADIATÆ; and,

6th, THE PLANIPETALÆ.

AFTER this short sketch, need I affirm that HALLER follows Nature closer than ever any did before? How many natural Classes! How finely connected! if we except some few Plants of the Diplostemones; the first orders of the Ilostemones; the third great order of that Class, which is mixed, though with very natural subdivisions; the Meiostemones, and the first order of the Aggregatæ, with some very few Plants dispersed up and down. I dislike the mixing of Trees, and it is for this reason alone I still prefer RAY, though in many other things much inferior to this learned man; and remarkably so in the connecting his Classes. RAY neglected that too much, HALLER affects it every where, and has succeeded, except in two or three Instances. Thus I do not think the Ilostemones and Diplostemones connected; for the putting in one Plant, as Acer, is not sufficient. I cannot say there is any affinity betwixt the Umbelliferæ and the third order of that Class, nor betwixt the subdivisions of that order; nor do I think the Meiostemones at all proper; nor consequently have the Siliquosæ any relation to what go before them. Lastly, the Ringentes are not connected with the Aggregatæ.

THESE

THESE are the few defects; the rest appears to me unexceptionable.

His generical characters are excellent. To his specific ones (that are often his own, though sometimes taken from LINNÆUS) he constantly adds a description of the habit, virtues, &c. of the Plant. And lastly, let me affirm to his honour, that he is the first who, in his *Ordo Generum*, has put Marks to distinguish those Genera inserted in his Classes that do not answer the Classical character; nor has he omitted adding them to those Classes under which they ought, according to the Rules of his System, to have been ranked.

WACHENDORFIUS published a system in 1747, of the *UTRECHT* Plants, taken much from ROYEN; but with such long Greek names, and so astonishing a Synopsis, that few people have ever looked into it. He has many of ROYEN's natural Classes, but reverses his system in some measure: he calls the Cup and Petals a double Perianthium: he has some orders taken from the proportion or number of the Summits to the Filaments: he begins with the Umbelliferae, and follows LINNÆUS's names: when that Author fails him, he takes up with BAUHIN's, not presuming to invent one. The very titles of his Classes are too tedious to copy; the reader must therefore have recourse to the work itself.

IN the *MEMOIRES DE BERLIN* for 1751, GLEDITSCH has given the outlines of another method. The great divisions are taken from the situation of the Chives: these are four

THALAMOSTEMONES, where they are fixed on one stage.

PETALOSTEMONES, ----- on the Petal.

CALYCOSTEMONES, ----- on the Cup.

STYLOSTEMONES, ----- on the Pointal.

EACH of these is divided into Chives united, or separate. This method seems entirely artificial; the superior orders are only given, and these generally are Apetalæ, Petalodæ, Æquales, Inæquales. Till it is more finished, it is not capable of further examination.

THERE is another attempt to form a method in a very singular manner by GUETTARD: it is by a microscopical examination of the Hairs. Fibres, &c. of the Leaves. He began in 1747, and has not, I believe, finished his scheme. What he at present attempts is putting all those Plants together in an order that he finds agree in

certain Marks. I must observe, that he says he follows LINNÆUS's natural fragment, and that it is almost entirely the same with TOURNEFORT's. I have hardly met with a bolder affirmation.

FINALLY, SAUVAGES published, in 1751, a method, in which the characters of Classes are taken from the form, situation, and disposition of the Leaves.

He arranges all Plants under eleven Classes.

1. APHYLLIÆ; those which have no Leaves, as Mushrooms. But he extends this farther than might be imagined; including even Rushes and Leeks, whose Leaves do not differ from their Stalks.

2. CESPITITIÆ; Plants with Leaves in tufts, as Mandrake, Auricula, and the like; adding the Orchis's, and some of the Grasses.

3. SPARSÆ ANGUSTIFOLIÆ; Plants with narrow and scattered Leaves. This vast arrangement holds the grasses, and many of the Liliaceæ with leafy Stalks.

4. SPARSÆ LATIFOLIÆ; with broad scattered Leaves: this also comprehends a vast number; which are subdivided according to the shape of the Leaves. These arrangements, if they were correct enough for any certain use, would be rather FAMILIES, than Classes of Plants; and those subdivisions would be the proper Classes.

5. ADVERSIFOLIÆ; with Leaves in Pairs; a very large number.

6. VERTISILLATÆ; with Leaves arranged in circles round the Stalk. This disposition of Leaves is indeed singular, and in a manner classical.

7. DIGITATÆ; with fingered Leaves. This comprehends those Plants with several Leaflets rising from one point, from the Trefoils to Hemp.

8. PALMATÆ; with handed Leaves; divided into many Segments, but not composed of distinct Leaflets; as Hop, the Figtree, &c.

9. PINNATÆ; with winged Leaves; containing the Pea and Vetch, and all such others.

10. DECOMPOSITÆ; with recomposed Leaves; composed of numerous Leaflets set upon divided and subdivided ribs; as in the Carrot, Fennel, and the like.

11. LACINIATÆ; Plants with jagged Leaves; this also is another very large Class.

LITTLE need be added as to the value of this proposed arrangement. Science rejects it; for the foundation is erroneous. The differences of Leaves, far from being the proper marks of classical divisions, cannot give even the characters of Genera. Nature has established Laws we cannot break; and has affixed marks which we may trace, but cannot pervert. On whatever parts of Plants the distinctions of Class, Order, and Genus are established, the use of Leaves can be only in specific characters.

THE work is however ingenious, and the author deserves great praise for his precision and accuracy. A great deal is to be learned from him; though he fails in the purpose of a method.

HIMSELF is sensible of the great uncertainty of his characters; and has very justly and judiciously, for that reason, often repeated the same Plant in various Classes; because its Leaves grow sometimes in one of his arrangements, sometimes in another: he has instanced the yellow Willow-herb, which comes very naturally in his fifth Class; but, as the Leaves sometimes are more numerous at the joints, unnaturally blends itself also with his sixth.

THUS we have examined the different Systems hitherto invented; we have seen their good and bad: and all that is further necessary to be said on this subject may be comprehended in a few words.

RAY, ROYEN, and HALLER are the only Authors that have, in spite of their method, attempted to follow Nature: all others have pitched upon some particular part of the Fructification, as the Fruit, the number, regularity or irregularity of the Petals; shape of the Flower; or shape and number of the Cup-leaves; or number of the Chives and Pointals. From one or other of these they have taken the characters of their Classes: that done, the whole vegetable race are distributed under some of those great divisions; though commonly numbers are put together that agree in no one thing, but the arbitrary character of the Class.

Is it therefore any wonder that these methods are as repugnant to Nature as to one another? Can we be surprized at the cruel wars every new System produced amongst Botanists? Each Systematic looked upon his own method as the Rule of Nature; and consequently attacked all distributions that did not coincide with his. But in truth every Author went on separate principles; the majority agreeing only

in neglecting Nature. One had therefore no right to censure the other, provided he kept strictly to his own rule. And let me here observe, that the very worst, the most unnatural of these productions, have been of great use to the study of Botany. The father of it had some favourite part of a Vegetable he preferred to the rest; he examines this in every light, and gives us a thousand good observations relating to it: others do the same. It is therefore to the united endeavours of those contending heroes we owe our knowledge of the various organs of Plants; their writings have served for scaffolds to RAY, HALLER, and ROYEN.

WHOEVER excels these must still begin to mount by the assistance of those that went before him. The superior genius of LINNÆUS has, in his *Philosoph. Bot.* in his characters, &c. dispised these helps, and explored untrodden paths: what was before him vague and uncertain, he has reduced to order and permanency; and even formed an alphabet, a new language, for this delightful science; freed it from a thousand defects, and embellished it more in a few years, than all the labours of antiquity had done for many ages, but still a great deal remains; for LINNÆUS is arbitrary, and Nature is yet neglected.

SYSTEMS of Plants seem to be necessary for two distinct purposes; the one to assist the memory; the other to range Vegetables, in such a manner, that every Tribe, Division, and Family may seem to be allied to those that precede, as well as follow it. In this last distribution, no arbitrary character of Tribes, &c. is upon any account to separate Plants naturally connected: this System is therefore more adapted to a natural history, than to facilitate the discovery of an unknown plant.

WE have seen in running over the various methods, that they have been reputed good or bad, according as they approach Nature; hence the disputes between writers on Botany. Whereas, in truth, though some approach nearer the mark than others, no System extent hitherto at all deserves the appellation of natural.

ALL have had in view the two very different purposes mentioned above, which appear incompatible with one another; they must therefore be separated, and Nature severely followed in the latter, though attended with a thousand difficulties to the learner: not but that ways will be found to obviate many of them.

PREVIOUS to the natural System, an artificial one must be formed, merely to assist the memory, and make us certain of the Plant we examine: for reason tells us, we must know a thing by sight, before we can pretend to assign it a proper place.

AND certainly, such a System may be formed for this purpose, as with very little time or trouble, will enable a person unacquainted with Botany, to find out an unknown Plant, as certainly as he would a word in a dictionary.

THIS will suit alike all the purposes of beginners; for, beside the regular students, there are many people of distinction possessed of great variety of Plants, that have neither time nor inclination for botanical researches, and yet wish to name a Tree or Herb that draws their attention. For these, and for the fair sex, this index is calculated. It has therefore no title to the name of System; let it be called a botanical Index or Dictionary. Here we fix upon arbitrary characters for Classes, Tribes, and Divisions; under these every Genus must be marshalled, and, in order to keep the Genera sacred and intire, wherever there are found Species in a Genus, differing from the characters its companions range under, the Genus will be repeated in some other Class, to whose laws the dissenting Species will submit, and that, toties quoties, wherever such difference appears. What is said with regard to Classes, holds also in the inferior orders; so that in this index we shall find a Genus, not only repeated in different Classes, but several times in the same Class under different orders. This will be so far from breeding confusion, that it will produce an absolute certainty of the Plant sought for: and to make it still more easy, the Flower of each Plant, expressive of the particular character it is ranged under; its habit and its other distinctive parts, will be engraved: This will be sufficient to answer all the views intended by this index. Here then all Genus's will be kept intire, though in their arrangement, Nature will be totally neglected: and with regard to the species, the part from whence the specific character is drawn, whether it be Leaf, Flower, Habit, &c. will be also engraved.

THUS we have an universal dictionary to the Vegetable kingdom, equally useful to the young beginner, and the real Botanist; for
where

where is the man blest with a sufficient memory to retain the marks of so many thousand Vegetables.

Let not some critic tell us, after this declaration, that we break all natural Classes, and separate near relations; we mean to do so. We mean, in the following Work, to have no mercy upon any Class, any Order, any System, that stops a minute our pursuit. With the utmost reverence for Nature, we chuse in this performance an easier guide; and if we attain the end proposed, this mere artificial index shall pave the way to a System of another kind; we are bold to say, a more natural one than has hitherto appeared: and so indeed it must be, or we should scarcely think it worth our while to give it to our country.

It might be expected perhaps, that the method of LINNÆUS should be assumed as this artificial System or Index of Plants; but we have shewn its imperfections for that service. We shall be infinitely obliged to him for the materials with which a new and more determined System may be formed; but more consideration, and farther researches into Nature, the only sure guides, shew us that a new System or Index of this kind may be established; the characters of which will be at least more familiar than his, if not also more determinate.

BEFORE we draw the outlines of this Index, let us state the difficulties that generally attend the first steps of Botany. These proceed from the different views each Botanist has had in forming his System.

BOTANY, like other branches of Natural History, has been reserved for a few studious men; too unfashionable to form a part of genteel education: it is generally acquired from books, and seldom if ever taught in universities. RAY is the favourite of this country; his Synopsis is commonly the initiating work: of late indeed the Linnean System has been introduced, and even our Ladies now number Chives and Pointals; but what immense difficulties attend the learner, who first attempts this or any other botanical performance. The want of generical specific characters in RAY, renders that author (though excellent in his way) unintelligible to a beginner: nor is LINNÆUS much easier. His characters are excellent, but necessarily long; essential differences, seldom existing in a single part, must be made out by strict examination of the whole, and an exact comparison with neigh-

neighbouring Genera. And is this so easy a work? besides, how many are the exceptions to his rules? They abound in every Class. Some indeed are remedied by rules of proportion, that an adept may profit by; but it will certainly puzzle a learner to obviate these and the other difficulties. They arise,

1. FROM the characters of the Classes frequently taken from inconspicuous or various parts of Plants; and these parts ranged in different Classes. Thus RAY draws his Classical character, sometimes from the Flower, sometimes from the Fruit, the Root, the Leaves, &c. LINNÆUS, more artificial, and therefore more uniform, takes the Chives, either as to number or proportional length: to these are added Classes of male, female, &c. Plants. The first followed Nature, the last maintained his sexual System.

2. FROM several Genus's in all Systems, answering in no particular to the character of the Class they are ranged under; and this the oftener, the nearer we follow Nature.

3. FROM the frequent varieties happening in the same Genus.

4. FROM the not being able to distinguish in a long character, the essential marks that separate the Genus's from one another.

5. THE necessity of often waiting for the Fruit before the real Genus can be determined with certainty.

THESE difficulties and many more most young beginners have no doubt experienced: but it will not be difficult to remove entirely these and other impediments. Thus in our work,

1. THE Flower, as the most obvious part of the Plant, will furnish invariably the classical character.

2. No Genus will ever be placed in any Class, the character of which does not strictly answer.

3. WHEREVER any Species of a Genus varies from the Class or order it is placed in, that Genus will be repeated, under other Classes or Orders, which each varying Species shall suit.

4. No part of the generical character will be expressed, but what is absolutely necessary to distinguish a Genus from others in the same Class.

FINALLY, the generical character will be drawn from parts visible to the eye during the Efflorescence; such as the Cup, Petals, Chives, Pointal, and Germ.

THE following page will show the key of the Classes.

A TABLE of the DISTINCTIONS and CHARACTERS of CLASSES in the ARTIFICIAL METHOD; or INDEX of PLANTS.

PLANTS may be divided into

HERBS, bearing Flowers

Visible;

Assembled together in a

Common Cup;

SERIES 1.

With united Chives:

The Corolla, Tubulated with Rays, — 1. Radiates. Sunflower.

Tubulated without Rays, — 2. Florets. Tanzy.

Tongued, — 3. Semiflorets. Sowthistle.

SERIES 2.

With distinct Chives, — 4. Associates. Thistle.

With distinct Cups, forming a head or ball, — 5. Aggregates. Thrift.

Separate, on Pedicels

SERIES 3.

Issuing from one Point, — 6. Umbrellas. Parsly.

Springing from various Points.

Perfect, viz. Chives and Pointal in the same Flower, or separate on the same Plant:

Complete, viz. furnished with both Cup and Petal.

SERIES 4.

Regular.

With One Petal, — 7. One-petal'd. Primrose.

Two Petals, — 8. Two-petal'd. Enchanter's Nightshade.

Three Petals, — 9. Three-petal'd. Spiderwort.

Four Petals, — 10. Four-petal'd. Tree Primrose.

Five Petals, — 11. Five-petal'd. Pink.

Six Petals, — 12. Six-petal'd. Hepatica.

Many Petals, — 13. Many-petal'd. Houfleeck.

SERIES 5.

Irregular.

With One Petal, — 14. One-petal'd. Snapdragon.

Two Petals, — 15. Two-petal'd. Ladyslipper.

Three Petals, — 16. Three-petal'd. Milkwort.

Four Petals, — 17. Four-petal'd. Lupine.

Five Petals, — 18. Five-petal'd. Pansie.

Six Petals, — 19. Six-petal'd. Iris.

Many Petals, — 20. Many-petal'd. Monotropa.

Incomplete, viz. only Cup or Petal, or neither.

SERIES

S E R I E S 6.

With Petals without Cup.

One Petal, —	21. One-petal'd.	Corn-flag.
Two Petals, —	22. Two-petal'd.	Coriſpermum.
Three Petals, —	23. Three-petal'd.	Xyris.
Four Petals, —	24. Four-petal'd.	Virgins Bower.
Five Petals, —	25. Five-petal'd.	Marſh Marygold.
Six Petals, —	26. Six-petal'd.	Bulbocodium.
Many Petals, —	27. Many-petal'd.	Globeflower.

S E R I E S 7.

With Cups without Petals.

Of One Leaf, —	28. One-leav'd.	Pellitory of the Wall.
Two Leaves, —	29. Two-leav'd.	Pepper.
Three Leaves, —	30. Three-leav'd.	Bur-reed.
Four Leaves, —	31. Four-leav'd.	Petiveria.
Five Leaves, —	32. Five-leav'd.	Orach.
Six Leaves, —	33. Six-leav'd.	Scheukzeria.
Eight Leaves —	35. Eight-leav'd.	Lady's Mantle.

S E R I E S 8.

Neither Cup nor Petal.

but a Huſk, — 36. Chaffy. Graſſes.

S E R I S 9.

Only Chives and Pointal, 37. Thready. Zanichellia.

S E R I E S 10.

Imperfect, viz. Chives on one Plant, Pointal on the other.

Chives alone, — 38. Chive-flowers. Melons.

Pointals alone, — 39. Pointal-flowers. Melons.

Invisible to the naked eye.

Terreſtrial.

S E R I E S 11.

With Leaves, — — 40 Ferns.

S E R I E S 12.

With articulated Scales, — 41. Moſſes.

S E R I E S 13.

With no ſort of Leaf or Scale, 42. Muſhrooms.

S E R I E S 14.

Sea-Plants, — — 43. Marines.

TREES, SHRUBS, and UNDERSHRUBS.

C H A P. II.

Of the DISTRIBUTION, NUMBER, and SUBDIVISIONS of
the CLASSES.

THE preceeding are plain, certain and obvious distinctions; founded on characters and marks, which are always to be seen in the Plant, when in Flower; and which perfectly serve the purpose of classical divisions; without waiting for the Fruit or Seed.

ACCORDING to these all Plants are arranged under forty-three Classes; of each of which the preceding Plate gives an Instance in a single object.

BUT between this large assortment of Classes, and the peculiar arrangement of Plants into Genera, there may be established a subordinate and very useful distinction. In the same Class there will be many Genera naturally united by some one striking character; and these may be arranged under the name of an ORDER, or subdivision of the Class. In many of the Classes there will be several such general agreements of Plants from certain conspicuous characters, which will give a new and useful division into a first, second, third Order, and so on. These subordinate marks, though they be not sufficient to become classical characters, yet will perfectly answer this purpose; and by dividing the number of Plants in the Class, will make any one that is sought the easier to be found. This will be explained familiarly by the arrangement of the several Orders of the first Class.

C H A P. III.

Of the FIRST CLASS.

Plants with visible Flowers, many assembled together in common Cup; with united Chives, and tubulated Florets surrounded by Rays.

BEFORE we enter on the subdivision of this Class, it will be necessary to explain the terms which constitute its character.

W^E

WE have shewn in the preceding Plates, that by the term Chives are meant those upright, slender bodies crowned with dusty heads, which occupy, in a certain number, the inside of a Flower, and surround the Rudiment of the Fruit, or the Style which rises from it.

THESE Chives consist of two different parts; the slender body supporting the head, and the head itself. The first we call the *THREAD* of the Chive, the other its *SUMMIT*; the term Chive including both, and expressing the whole.

THE term Floret is used distinctively to express a single pip of this head or assemblage; the whole cluster, together with the general Cup, being named in express terms the Flower.

THE Rays are the flat Petals surrounding the Verge.

FLORET is a diminutive of Flower; and is a necessary distinction in the Plants of this assembled kind which have two sorts, as the tubulated and radiated in the same Cup; and even in the second and third Classes, where all are of one kind, it is useful; because it gives us a distinct manner of expression.

THUS, in speaking of the common Plant, Groundsell, we shall be regularly understood when we call the entire assemblage of pips in one common Cup, the Flower; and any one of those pips separated a Floret.

THE term Tubulate or hollow is used only in distinction from the character of the Rays, and of the Florets of the third Class, which have all the other characters of the rest, but that the Florets are flat, or, as the selected term expresses it, tongued. In the present Class there is an assemblage of the two kinds; tubulated Florets occupying the Center, and Rays, which are of the nature of tongued Florets, forming the Verge.

THE form of the tubulated Floret is very regular and constant; and therefore easily known.

IT is made of a single Petal; and is a long, slender Tube, which grows large upwards; and spreading out at the verge like a bell, is there divided into five Segments. These naturally spread open, and often turn back. This form and division are both invariable. Such a Floret is represented in Plate 14, Figure 1. The Chives and Style being taken out not to disturb the view.

THIS Floret naturally rises from the Summit of the embryo Seed, where there is a little rising verge that defends its base, in manner of a Cup, beside the general or common Cup, which includes all the Florets, with their subjacent Seeds: this is fixed to the swol'n head of the Footstalk, which is what we call the Common Receptacle.

THE Chives in each Floret answer to the number of the divisions of its Rim: they are naturally five; and they take their origin from the neck of the Pip. A tubulated Floret with its Chives as they stand naturally, is represented at Plate 14. Fig. 2: and at Plate 14. Fig. 3. is a Floret of the same form cut open to shew their insertion: the long, slender body split at the end, which rises in the midst of these Chives, and pierces the Tube they form, is the female Organ or Style of the Floret; and being alike in all the Flowers of this and the two succeeding Classes, it has nothing to do in the classical characters, nor can be the least serviceable even in our subdivisions. It is figured because it exists in Nature, but it is to be passed over unregarded.

THE union of the Chives is thus formed.

THEIR Threads are very slender and very short; their Summits are oblong, of equal breadth, and raised erect: they touch, and are joined one to the other at the sides, and together form a hollow Cylinder with an indented Rim; or a regular firm Tube, like what our joiners make when they compose a hollow shaft of a column of a number of plain narrow boards.

THE verge of this Tube usually reaches nearly or entirely to the height of the Floret itself; and therefore appears in it as if it were another, and yet lesser, Flower.

THE Chives with their united summits separated from the Floret are represented at Plate 14. Fig 4; at Fig. 5. the same with the Style, and at Fig. 6. with one Chive separated from the rest.

WHATEVER Plant has its general Flower composed of Florets of this tubular form, surrounded by a verge of Rays, and the Chives thus united, is of the first Class. There are very many such, and it will be therefore useful to arrange them in different orders; according to the most certain and obvious distinctions which are common to any number of them.

As the character of the Class is established upon the form and construction of the Florets and Rays, these distinctions of the orders of
the

the Clafs are to be fought in the entire Flower. There is an essential part of it remaining from which we may take them ; this is the general or common Cup, which includes the whole assemblage of Florets and Rays.

THAT we may be distinctly understood in this, a common Cup is represented at Plate 14. Fig. 7. The same Cup is also represented at Fig. 8. cut open to shew the manner wherein the receptacle of Flowers is contained in it : and the receptacle separated at Fig. 9.

THE common or general Cup in the Plants of this Clafs is either entire, or composed of several Leaves, Scales or Segments ; and these, according to their number or various arrangement, in a single series or in several ranges, or with a peculiar circle at the Base, will give the characters of five natural orders in this Clafs : for in all these instances, where one Plant of the kind has the Cup of a peculiar shape or structure, all of the same genus have it with the same character.

THUS we have a regular subdivision of the great Clafs of tubulated Florets with Rays, and with united Chives, into no less than five regular subdivisions, each marked and ascertained by a distinctive character. These constitute the five orders. The down upon the Seeds of these Plants might furnish also some other characters of distinction, but the former are sufficient ; and we comprise all characters within the compass of the Flower.

THE five Orders of the first Clafs are these.

O R D E R I.

PLANTS with assembled tubulated and radiated Florets and united Chives, whose general Cup is ENTIRE ; that is, of one piece, only cut into slight Segments at the Rim. See Plate 14. Fig. 10.

O R D E R II.

PLANTS with assembled tubulated and radiated Florets and united Chives, whose general Cup is SIMPLE ; that is, formed of a single series or row of Leaves, Scales, or Segments. See Pl. 14. Fig. 11.

O R D E R III.

Whose general Cup is DOUBLE ; or composed of two distinct rows of Scales. Pl. 14. Fig. 12.

O R -

O R D E R IV.

WHOSE general Cup is **TILED**; or composed of numerous Scales in rows lying over one another, the outer ones gradually shorter than the inner. See Pl. 14. Fig. 13.

O R D E R V.

WHOSE Cup is **FRINGED**; or has, besides a single series of oblong Scales which enclose the Florets, a distinct single series of shorter Segments, which serve as it were as a Cup to the other, and appear a kind of fringe round its bottom. See Pl. 14. Fig. 14.

THESE Characters are distinct, and independant of the general shape of the Cup.

IN the preceeding instances, at Figures 10, 11, 12, 13, 14, we have given the Cup alone, divested of the Florets; because the peculiar formation of the Cup which gives the character of the Order may be thus best understood: but that they may be also known as they appear in Nature on the Plant, we have represented them in the five succeeding Figures, 15, 16, 17, 18, 19. with the Florets in them.

THE intire Flower of the Tagetes with its Cup, is represented in this view at Fig. 15, to shew what is meant by an intire Cup.

THE Flower of the Coltsfoot at Fig. 16. to shew the **SIMPLE** Cup, or that consisting of a single row of Scales.

THE Flower of the Marygold at Fig. 17, to shew the **DOUBLE** Cup.

THE Flower of the China Aster is represented entire at Fig. 18, to shew the structure of a **TILED** Cup, that is composed of several ranges of Scales laid like tiles over one another.

THE Flower of the Senecio is represented at Fig. 19, to shew the structure of the **FRINGED** Cup; or that which is formed of a series of long Scales, with a number of short ones at the bottom.

THESE five Figures therefore represent the five distinct Orders of the first Class; all agreeing in the form of the tubulated Floret divided into five Segments; and in the surrounding Rays.



1. A tubulated Floret without its Chivas.



2. A tubulated Floret with its Chivas.



3. A tubulated Floret cut open.



4. The united Chivas separated from the Floret.



5. The united Chivas with the Style.



6. The Chivas with one separated.



7. A Common Cup.



8. A Receptacle.



9. An entire Cup.



10. A simple Cup.



11. A double Cup.



12. A lobed Cup.



13. A fringed Cup.



14. Ligules in its Cup.



15. Colic foot in its Cup.



16. Hairy pelt in its Cup.



17. Aster in its Cup.



18. Senecio in its Cup.

H E R B S.

S E R I E S I.

With UNITED CHIVES.

C L A S S I.

With ASSEMBLED TUBULATED FLORETS, furrounded by
Rays.

O R D E R I.

With the GENERAL CUP ENTIRE.

G E N U S I.

FRENCH MARYGOLD*.

TAGETES.

Character of the Genus.

The Cup has five Ridges lengthwise, and five slight Indentings at the Rim.

Plate 15. Fig. *o a a b*.

I. SPREADING FRENCH MARYGOLD.

Plate 15. Fig. 1. COMMON FRENCH MARYGOLD.

Character of the Species.

Tagetes patula.The Stalk is divided and subdivided, into a multitude of
spreading Branches.Fig. 1. *a a b b*.**C**OMMON as this Plant is now in our Gardens, it is a native of Mexico: we raise it in hot-beds in Spring, and it bears the free air afterwards. It is an Annual, a yard high, with dusky Leaves, and

* The received English names both of the Genera and Species of Plants, it must be owned, are often injudicious. This before us is an instance: for the Plants are not of the Marygold kind; nor are they the produce of either France or Africa. It would be easy to contrive better denominations: but, as these are universally known, it appears more eligible to retain them. To prevent any ill effect from this, the regular generical Latin name, will be always added at the head of the Genus; and the received trivial Latin name to every Species. The trivial English name where there is any such, will be also added in a peculiar character over the Latin.

deep purplish yellow Flowers, appearing in succession from July to October. The Flowers have naturally an ill smell, but culture takes this off; and yields them also striped, double, curled and quilled with vast variety and beauty. We call it the French Marygold.

2. UPRIGHT FRENCH MARYGOLD.

Plate 15. Fig. 2.

AFRICAN MARYGOLD †.

Character of the Species.

Tagetes erecta.

The Stalk is undivided, and supports a few Flowers placed singly on naked Footstalks.

Fig. 2. *a b b*.

THIS also is an Annual, native of Mexico, but hardy enough to bear open air with us through Summer. It is four Feet high; the Leaves are pale green, and the Flowers of a faint, and but inelegant yellow. It blows from July to the very end of Summer. Culture has all the happy effect on this we have mentioned in the other: the Flower grows double, and the added Petals fold, curl, and wave, and quill about, and among one another, with a great encrease in size and beauty.

3. PETTY TAGETES.

Plate 15. Fig. 3.

Character of the Species.

Tagetes minuta.

The Stalk is undivided, and the Flowers are clustered upon scaly Footstalks.

Fig. 3. *a. a. b.*

This pale and dwarf resemblance of the upright kind we have from Chili. It is an Annual; flowering late in Autumn; with edged Footstalks to the Leaves, and filmy supports to the clustered Flowers. They are little and white.

† This is an instance of a very improper trivial English specific name; since it would seem rather the denomination of a different Genus, than only of a distinct Species. It will be better hereafter to call the plant by the name here given, UPRIGHT FRENCH MARYGOLD: the term African is only annexed, because it is in use.

FRENCH-MARYGOLD.

Pl. 15



Generic
Character.



Spreading
French-Marygold.

Upright
French-Marygold.

Diffuse
French-Marygold.

G E N U S II.

S E G G R O M.

O T H O N N A.

Character of the Genus.

The Cup is even on the Surface ; and is cut into eight Segments at the edge.

Plate 16. Fig. 1. *a a*.

1. KIDNEY-LEAV'D SEGGROM.

Pl. 16. Fig. 1.

Character of the Species.

Othonna geifolia.

The Leaves are rounded, sunk in at the Footstalk, and indented about the edge.

Fig. 1. *a*.

THIS is a small, perennial, creeping Plant ; native of the hotter parts of Africa. The bottom of the Stem is hard, tho' but weak ; leaning, and trailing on the ground, but this way crawling to the length of two feet or more. The Leaves are of a brownish green, and the whole Plant has so much of the aspect of Ground-Ivy, both in their form, and in its manner of growth, that one is surpris'd to see upon it radiated Flowers. They are of a delicate yellow ; and blow all Summer.

2. EGG-LEAV'D SEGGROM

Plate 16. Fig. 2.

Character of the Species.

Othonna Bulbosa.

The Leaves are of the shape of an egg ; the Stalk is tender to the bottom.

Fig. 2. *a. b*.

THIS also is a Perennial, though a weak, low Plant : we have it from the same warm climate with the other ; for Nature spreads it over the Æthiopian sands in great profusion. The Leaves are bright green, and the Flowers gold yellow. The weak Stalk rises but to eight or ten

en inches, and that leaning toward the base. The Root is singular : it is rounded as our Crowfoot, or as the Turnip kind ; a globular tuberous one ; but not at all a Bulb.

3. AMPLEXICAUL SEGGR0M.

Plate 16. Fig. 3.

Character of the Species.

Othonna sonchifolia.

The Leaves are long and jagged, and they embrace the Stalk at their Base.

Fig. 3. *a. a.*

THIS is a specious, though singular Plant. We have it from the remote Africa, with its brethren : but it rises higher, more erect and stately ; and has vast crimson Flowers. The colour of the Leaves is a dull green. LINNÆUS calls this *Sonchus*-leaved *Othonna* ; but even trivial names should give some character. Himself has taught us to avoid the practice.

HEART-LEAV'D SEGGR0M.

Plate 16. Fig. 4.

Character of the Species.

Othonna sibirica.

The Leaves are heart-shaped and dented ; the Stalk is unbranched.

Fig. 4. *a. b.*

This is a native of Siberia : a Perennial, with large, handsome, pale green Leaves ; and a slight, simple, almost naked Stalk. The Flowers are of a Lemon yellow. It blows from June to September.

5. MARSH SEGGR0M.

Plate 17. Fig. 1.

Character of the Species.

Othonna Palustris.

The Leaves are lanced, and sharply dented.

Fig. 1. *a. a.*

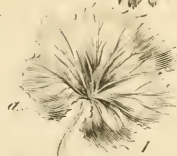
THIS is a perennial English Plant, native of our marshes towards the Sea ; and Flowers from June to October. It is a yard high and scarce at all divided into Branches. The Stalk is thick and often red ;

SEGGROM.

Pl. 10



Generic
Character.



Kidney-Leaved Seggrom.



Heart-Leaved Seggrom



Egg-Leaved
Seggrom.



American Seggrom?



red; the Leaves are of a fine fresh green; the Flowers are large, and of a golden yellow. The indentings of the Leaves are deepest toward the ground.

6. UMBRELLA'D SEGGROM.

Plate 17. Fig. 2. MOUNTAIN RAGWORT.

Character of the Species.

Othonna integrifolia.

The Leaves are undivided: the Flowers grow at the top like an Umbrella.

Fig. 2. *a, b.*

THIS also is an English Plant; a Perennial, native of our high grounds, and flowers in August. It is a foot high, upright, robust, and simple in the Stalk: the Leaves are broad and lanced; of a greyish green, and naturally undivided, except for here and there a slight dent. The Flowers are of a faint yellow. At the head of the Stalk, where the Footstalks of the Flowers rise, there is a kind of thready mantle. It has in this a strange alliance with the umbrella'd Plants.

7. WHITE-HAIR'D SEGGROM.

Plate 17. Fig. 3.

Character of the Species.

Othonna helenitis.

The Leaves are lightly covered on each side with long, distant, white hairs.

Fig. 3. *a.*

THIS is a Perennial, native of France and of the remote Siberia. It is half a yard high, with an undivided Stalk. The Leaves are oblong, lanced, and are most delicately and minutely sawed along the edge. The Flowers are yellow, and blow in July. One crowns the Stalk, and a kind of Umbel rises round it. The Flowers succeed one another; the simple one at the head opening first.

8. PINNATIFID SEGGROM.

Plate 17. Fig. 4.

Character of the Species.

Othonna cineraria.

The Leaves are cut into deep Segments, and those are again divided.

Fig. 4. a. a.

THIS is a North-American ; a Perennial ; that flowers from June to August. The Stalk is tender, but half a yard in height, and branched. The Leaves are of a dusky green, and hairy on the under part. The Flowers are of a delicate yellow, and the Rays spread flat and wide open. There is something in the aspect of the Plant like the Sea Ragwort, but it is not shrubby.

9. MEALY SEGGROM.

Plate 17**. Fig. 9.

SEA RAGWORT.

Character of the Species.

Othonna maritima.

The Leaves are broad, cut in the pinnatifid manner, and the Segments cut again.

Fig. 9. a. b.

THIS is a Perennial, native of the coasts of France and Italy, and flowers in September. The Stem is woody, and a yard high : the Shoots are tender and greyish : the Leaves are white, and mealy on the under part, which they shew in various directions : the Flowers are small and yellow : the singular whiteness of its Leaves, and its bushy aspect, have long kept it in our gardens.

10. PECTINATE SEGGROM.

Plate 17**. Fig. 10.

Character of the Species.

Othonna pectinata.

The Leaves are oblong, and sinuated in even rows, like the teeth of a comb.

Fig. 11. a. b.

THIS is a Perennial woody plant, native of Æthiopia, and flowers in August : the Stem is brown : the Leaves are of a delicate and fine green : the Flowers are yellow.



Marsh Seggrom.



Pinnatifid Seggrom.



Umbrella'd Seggrom.



White hair'd
Seggrom.

II. MULTIFID SEGGROM.

Plate 17 **. Fig. 11.

Character of the Species.

Othonna Abrotanifolia.

The Leaves are cut into innumerable narrow segments in the winged manner.

Fig. 11. *a. b.*

THIS is a perennial Plant, with a woody Stem, native of the Cape of Good Hope: it flowers in August. The old Bark is of a reddish hue: the young twigs are green: the Leaves are of a pale, and somewhat greyish green: the Flowers are yellow.

12. VARIOUS LEAV'D SEGGROM.

Plate 17 **. Fig. 12.

Character of the Species.

Othonna coronopifolia.

The lower Leaves are lanced, and undivided: the upper are deeply cut.

Fig. 12. *a. b.*

THIS also is a woody Plant, a Perennial, native of the Cape of Good Hope, and flowers in August: the Stem is brown: the young Shoots are often tinged with a very delicate crimson: the Leaves are of a fresh and elegant green: the Flowers are yellow.

13. GLAU COUS SEGGROM.

Plate 17 **. Fig. 13.

Character of the Species.

Othonna cheirifolia.

The Leaves are fleshy, lanced, obtuse, and undivided.

Fig. 13. *a. b.*

THIS is a Perennial, native of Africa, and flowers in September. The Base of the Stem is woody, and it divides into a great number of Branches of a foot and half long, which lie upon the ground at their origin, but raise their leafy tops. The Bark of the woody part is of a pale brown: the Leaves are very thick set, and of a peculiar and pleasing

pleasing colour, a pale bluish green; such as we see on many of the sea Plants. The Flowers are yellow.

14. WEDGE-LEAV'D SEGGRON.

Plate 17 **. Fig. 14.

Character of the Species.

Othonna dendata.

The Leaves are of an oval form, but broad and wedgy at the ends.

Fig. 14. *a. b.*

THIS is a native of the Cape of Good Hope, a bushy Plant, with a hard Stem, flowering in August: the old Bark is greyish: the Branches are of a pale green: the Leaves are also of a pale but fresh green; and the Flowers are large, and of a very beautiful yellow.

* * Firmness of the Stalks in these last Seggroms is not to place them among Trees and Shrubs: they are properly woody Plants: the Cape affords a number of like structure, and even Europe is not destitute of them; nor is this limited to the Perennial Plants: we have Annuals whose Stems are absolutely woody. The shores of France and Sicily shew it in the Buboniums, which will be described hereafter, page 40. and Boccone has not unjustly added it to the distinctive characters of one of them. His After Supinus Lignosus is an Annual; the Footstalk'd Bubonium of our succeeding; 74 Plate, Fig. 3. and we shall have occasion to shew more instances.

ORDER



3



a.

9

Waxy Seggrom.



10

Pectinate Seggrom.



a.

11

Multifid Seggrom.



a.

12

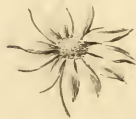
Varioustrav'd Seggrom.



a.

13

Glaucous Seggrom.



a.

14

Wedge-leav'd Seggrom.



O R D E R II.

With the Cup SIMPLE: or formed of a single row of Scales.

G E N U S I.

HEMP - AGRIMONY.

B I D E N S.

Character of the Genus.

The Cup is broad; and its Scales are equal, pointed, and hollowed lengthwise.

Plate 18 Fig. *o a a b*.

1. DROOPING HEMP AGRIMONY.

Plate 18. Fig. 1. UNDIVIDED LEAV'D HEMP AGRIMONY.

Character of the Species.

Bidens cernuda.

The Leaves embrace the Stalk; the Flowers hang drooping; and the seeds stand strait.

Fig. *1 a b c*.

THIS is an Annual, three feet high, native of our ditch-sides, and flowers in Autumn. The Stalks are tinged with crimson; the Leaves are of a deep green, and have something of the same redness. The Flowers are of a delicate yellow, and there are several oblong Leaves under the Cup. The seeds do not spread, but stand strait. The Rays often grow to the Scales of the Cup.

2. VERTICILLATE HEMP - AGRIMONY.

Plate 18. Fig. 2.

Character of the Species.

Bidens verticillata

The Flowers grow in circles round the Stalks, and the Leaves are hoary underneath.

Fig. *1. a. a. b.*

THIS is an Annual, native of Vera Cruz; a low Plant flowering most part of the year. The Stalk is reddish; it trails upon the ground

ground to a foot long. The Leaves are of a fresh green on the upper side, but underneath they are white and downy. The flowers are small and yellow. The Leaves stand alternately on the lower part of the Stalk; but in pairs on the upper part, where the Flowers grow.

3. TWICE-WINGED HEMP-AGRIMONY.

Plate 18. Fig. 3.

Character of the Species.

Bidens bipinnata.

The Leaves are winged, and the divisions winged again; the seeds spread.

Fig. 3. a. a. b.

THIS is an Annual, native of Virginia, and flowers in August. The Stalks are yellowish, and the Leaves of a faint green. The Flowers are often but imperfectly radiated; and sometimes they want the Rays entirely; but when perfect they are very beautiful.

4. SIMPLY WINGED HEMP-AGRIMONY.

Plate 18. Fig. 4.

Character of the Species.

Bidens frondosa.

The Leaves are winged, and the Leaflets are serrated.

Fig. 4. a. b.

THIS is an Annual, native of Virginia. It is four feet high, and flowers in July. The Stalk is red; the Leaves are dusky, and the Flowers are of a delicate yellow.

5. BUBBLY HEMP-AGRIMONY.

Plate 18. Fig. 5.

Character of the Species.

Bidens bullata.

The Leaves grow in pairs on the lower part of the Stalk, and in threes above.

Fig. 5. a. a.

THIS is an Annual, native of America; an upright, hairy plant, flowering in June. The Leaves are of a dead green, rough, and raised in bubbles. The Flowers are yellow.

* * * THERE are other *Bidens*, which have no Rays, and will be found in the second Class.

HEMP AGRIMONY.

Pl. 18.



Generic Character.



Creeping
Hemp Agrimony.



Verticillate Hemp
Agrimony.



Triple Winged Hemp
Agrimony.



Simply Winged Hemp Agrimony.



Bulbous Hemp Agrimony.

GENUS II.

TUSSILAGO.

Character of the Genus.

The Cup is oblong; its Scales are narrow, flat, and equal:
the Rays of the Flower are narrow.

Plate 19. Fig. 1. *a. a. b.*

1. COY TUSSILAGO.

Plate 19. Fig. 1.

Character of the Species.

Tussilago anandria.

The Leaves are egg-shaped, but have also some small divisions toward the base.

Fig. 1. *a. b.*

THIS is a perennial; native of Siberia, a low and humble Plant, so coy and delicate in the opening of its Flower, that it requires warm courtship from the Sun; and in the northern climates was supposed for a long time incapable of blowing at all. The Leaves are of a delicate green, and their underside is downy. The Stalk is weak, tender, redish, and but four inches high: naked, except for a few slight films; and at its top supports only a single Flower. This is large, and of a delicate snowy white.

2. HEART-LEAVED TUSSILAGO.

Plate 19. Fig. 2.

Character of the Species.

Tussilago farfara.

The Leaves are heart-shaped, but cornered and indented;
the Flower-stalk is thick and Scaly.

Fig. 2. *a. b.*

THIS is our common Coltsfoot; a perennial Plant, frequent in wet, tough soils; whose Flowers appear in February, and its Leaves not till April. The Stalk supports only a single Flower; it is thick, tender, hollow, redish, and covered thick with filmy scales. The Flower itself is large, specious, and yellow. The Leaves are of a faint green, but on their under part white; covered with a tough, firm, cottony substance, capable of being wrought into cloth. An infusion of the Leaves of this Plant sweetened with honey is excellent in all disorders of the breast.

3. TOWER.

3. TOWERED TUSSILAGO.

Plate 19. Fig. 3.

Character of the Species.

*Tussilago frigida**

The Flowers grow several upon one Stalk in a loose cluster.

Fig. 3. *a. a.*

This is a native of the Swifs low grounds, and of their hollows between the mountains: it is a perennial, flowering early in spring. The Leaves are very large, of a black green on the upper side, and white underneath. The Stalk is thick and filmy, and the Flowers are small and of a pale crimson.

4. CRIMSON TUSSILAGO.

Plate 19. Fig. 4.

Character of the Species.

Tussilago alpina.

The Leaves are small, and roundish, but hearted at the base and dented.

Fig. 4. *a. b.*

THIS also is a perennial; a small, low Plant, native of Germany, and flowers early in Spring. The Leaves are of a dark green, but hoary underneath; and the weak Stalk supports a single Flower.

* * LINNÆUS joins the *Tussilago* and *Petasites* in one Genus. They are distinct; but the third Species connects the two Genera in the order of Nature.

G E N U S III.

HELENIA.

Character of the Genus.

The Cup spreads broad; its Scales are short, large at the Base, and narrow upwards.

Plate 20. Fig. 1. *a. b.*

Of this singular Genus we know only one Species

A L A T E D

COLTSFOOT

Pl. 19



Generic Character.



1
Coltsfoot.



2
Heart-leaved
Coltsfoot.



3
Sowerbi Coltsfoot.



4
Crimson Coltsfoot.



WELT-WORT.



*Generic
Character.*

HARD SEED.



*Generic
Character.*



Golden Weltwort



Palmated Hardseed.

PALMATED HELENIA.

Plate 20. Fig. 1.

Character of the Species.

Helenium autumnale.

The Leaves run down the Stalk in lengthened Films.

Fig. 1. *aa.*

THIS is a perennial; native of North America, a specious, tall, and gaudy Plant: it bears the air with us, and flowers in August. The Stalk is round and hollow, ribbed and winged from the Base of the Leaves, and grows to five feet high. The Leaves are of a delicate green, long, smooth, and narrow. The Flowers are very large; they crown the spreading head of the Plant in a vast number, and are of a gold yellow.

GENUS IV.

OSTEOSPERMUM.

Character of the Genus.

The Cup is hemispherick; and its Scales are small and sharp pointed.

Plate 20. Fig. 2. *ab.*

1. PALMATED OSTEOSPERMUM.

Plate 20. Fig. 2.

Character of the Species.

Osteospermum uvedalia dictum.

The Leaves are broad, and divided in the manner of a hand.

THIS is a perennial, robust, and specious Plant, native of Virginia, and flowers all the Autumn. The Stalk is five feet high. The Leaves are large: they stand in pairs; and are divided into a number of deep Segments. The flowers crown all the branches; and are large and of a delicate yellow. The Rays are few, but they are very long; and the structure of the disk is in no Plant more distinct or conspicuous.

* * * THERE are other Osteospermums; but they are shrubs, and have their place hereafter.

GENUS V.

CHRYSOGONUM.

Character of the Genus.

The Cup spreads flat, and its Segments are only five; they are lanced and cut down to the Base. The Flower has only five Rays.

Plate 21. Fig. 1. *a b*.

1. FOOTSTALKED CHRYSOGONUM.

Plate 21. Fig. 1.

Character of the Species.

Chrysogonum Virginianum.

The Leaves are placed upon long Footstalks.

Fig. 1. *a*.

THIS is a perennial, native of Virginia, a tender, though rough looking Plant; and flowers from June to September. The Stalk is ribbed, rough and hairy; and is divided toward the top into many branches. The flowers are yellow, and their Rays are only five.

2. AMPLEXICAUL CHRYSOGONUM.

Plate 21. Fig. 2.

Character of the Species.

Chrysogonum Peruvianum.

The Leaves stand without Footstalks, embracing the Stem.

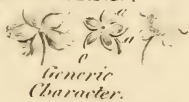
Fig. 2. *a a*.

THIS is an Annual, native of Peru; and covered over with Flowers the latter part of Summer. The Stalk is upright, round, smooth, and divided. The Flowers are yellow; they stand singly on the heads of the Stalk and principal Branches.

GENUS



MAID-WEED.



G E N U S VI.

P A R T H E N I U M,

Character of the Genus.

The Cup spreads out ; the Segments are only five ; they are roundish and cut to the Base.

Plate 21. Fig. 00a.

I. COMPOUND-LEAVED P A R T H E N I U M.

Plate 21. Fig. 3.

Character of the Species.

Parthenium hysterophoros dictum.

The Leaves are compound, and divided into many parts.

Fig. 3 a.

THIS is an Annual, native of Jamaica, flowering on the sandy, rising grounds, in July. The Stalk is rounded, ribbed, weak, and slightly branched. The Leaves are of a faint and unpleasing green. The Flowers are yellow in the disk; but their few slight Rays are white.

2. EGG-LEAVED P A R T H E N I U M.

Plate 21. Fig. 4.

Character of the Species.

Parthenium integrifolium.

The Leaves are simple, of an egg shape, and dented at the edge.

Fig. 4. aa.

THIS is a biennial, native of Virginia, and flowers in August. The Stalk is firm, and toward the top divided into many Branches. The Leaves are of a strong green ; the Flowers are snow white, but their disk is yellow.

G E N U S VII.

MELAMPODIUM

Character of the Genus.

The Cup spreads wide ; its Segments are only five ; they are oval, but extended greatly in length.

Plate 22. Fig. 1. *o a a*.

LARGE-CUPPED MELAMPODIUM.

Plate 22. Fig. 1.

Character of the Species.

Melampodium Americanum.

The Segments of the Cup are equal in length to the Rays of the Flower.

Fig. 1. *a b*.

THIS is a Perennial ; native of Vera Cruz, and flowers in August. The Stalk is lightly ribbed. The Leaves are of a fresh and very delicate green. The Flowers are yellow. The Rays of a paler, but the disk of a stronger colour. We yet know no other Species of this Genus.

G E N U S VIII.

TETRAGONOTHECA.

Character of the Genus.

The Cup spreads open ; it has only four Segments, and these are flat and triangular, but hearted.

Plate 22. *o o a*.

OVAL-LEAVED TETRAGONOTHECA.

Plate 22. Fig. 2.

Character of the Species.

Tetragonotheca helianthoides.

The Leaves are oval and waved at the edge.

Fig. 2. *a a*.

THIS is a biennial ; native of Virginia, and flowers in August. a robust, tall, and hardy Plant. The Stalk is raised up in round ribs. The Leaves are of a strong but coarse green. The Flowers are vast, and of a delicate yellow : their Rays are above twelve.

G E -

BASE SUN-FLOWER.

Pl. 22

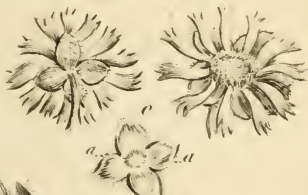


Generic Character.



Large-leaved Base Sun-flower.

BROAD-WEED.



Generic Character.



Great-leaved Broad-weed.

G E N U S IX.

B I R D - W E E D .

S I G E S B E C K I A .

Character of the Genus.

The Cup is very large, and has five long Segments divided to the Base : each Floret has also at its Bottom an oval, hollow Leaf.

Plate 23. *o a a b c.*

1. SIMPLE - L E A V ' D B I R D W E E D .

Plate 23. Fig. 1.

Character of the Species.

Sigesbeckia orientalis.

The Leaves have Footstalks which rise naked from the Stem.

Fig. 1. *a a.*

THIS is an Annual, native of China and other parts of the east ; and flowers in July. The Stalk divides toward the top into a few slight Branches. The Leaves are of a fine green. The Flowers are yellow ; and the Cup is covered with thick hairs. Birds make nests of those Cups.

2. A L A T E D B I R D - W E E D .

Plate 23. Fig. 2.

Character of the Species.

Sigesbeckia occidentalis.

The Leaves have Footstalks which run down the Stem.

Fig. 2. *a a.*

THIS is a biennial, native of Virginia ; and flowers in June and July. It is a handsome Plant. The Leaves are of a fresh green, and the green rib they carry from their Base down the Stalk gives it variety and beauty. The Flowers are yellow.

G E N U S X.

F O R K W O R T.

M I L L E R I A.

Character of the Genus.

The Cup is triangular and flat, and has only three Segments, of which one is large and two are small.

Plate 23. Fig. *o a a a b*.

1. FIVE-FLOWERED FORKWORT.

Plate 23. Fig. 3.

Character of the Species.

Milleria quinquiflora.

The Leaves are heart-shaped; and the Footstalks of the Flowers split.

Fig. 3. *a a*.

THIS is an Annual, native of Panama and Vera Cruz; and flowers in August. The Stalk is ribbed and branched. The Leaves are of a dusky green, and spotted with black. The Flowers are of a delicate yellow.

2. TWO-FLOWERED FORKWORT

Plate 23. Fig. 4.

Character of the Species.

Milleria biflora.

The Leaves are oval, and the Footstalks of the Flowers are single.

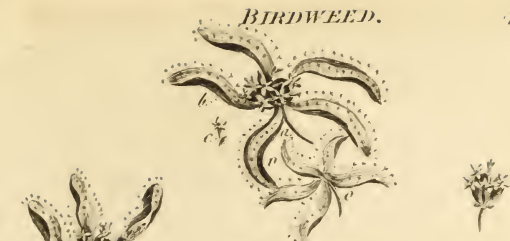
Fig. 4. *a a*.

THIS is an Annual, native of Campeachy. The Stalk is weak and reddish. The Leaves are of a fresh green. The Flowers are yellow; but their Cups are often stained with crimson.

O R D E R

BIRDWEED.

Pl. 23



Generic Character.



Simple-leaved Birdweed?



Matted Birdweed?

FORKWEED.



Generic Character.



Two-flowered Forkweed?



Five-flowered Forkweed.

O R D E R III.

With the Cup DOUBLE, or formed of two Rows of Scales ;
An outer and an inner series.

G E N U S I.

LEOPARDS-BANE.

DORONICUM.

Character of the Genus.

The Cup spreads, and is formed of long and narrow Scales.

Plate 24. Fig. *a a*.

1. SPREADING LEOPARDS-BANE.

Plate 24. Fig. 1.

Character of the Species.

Doronicum pardalianches.

The rays of the Flower are broad and short ; the Leaves are heart-shaped and have edged Footstalks.

Fig. 1. *a b*.

THIS is a Perennial, hardy Plant, native of Switzerland and Hungary ; and flowers in June. It is a yard high. The Leaves are of a faint green, and they lose their winged Footstalks toward the top of the Plant. The Flowers are of a delicate pale yellow.

2. RAMPING LEOPARDS-BANE.

Plate 24. Fig. 2.

Character of the Species.

Doronicum plantagineum.

The rays of the Flower are long and narrow ; and the Side-shoots are long and rise alternately.

Fig. 2. *a b*.

THIS also is a Perennial, a tall and robust Plant ; it is a native of the warmer parts of Europe, and flowers with us in the open ground
in

in May. The Stalk is a yard high. The Branches are few: they are long, ramping, and alternate. The Leaves are of a pale green; and the Flowers large and of a very beautiful yellow.

3. WOOLLY LEOPARDS-BANE.

Plate 24. Fig. 3.

Character of the Species.

Doronicum incarnum.

The Leaves are woolly underneath: the Stalk is leafy, and supports only a single Flower.

Fig. 3. *a b.*

THIS is a native of the Pyrenæan and Swiss mountains; a hardy, though an humble Plant. The Stalk is single, unbranched, and is naturally brown. The Leaves are of a delicate green on the upper side, but white and woolly underneath; and the one Flower which crowns the summit of the Stalk is of a bright and glowing gold colour.

4. DAISY LEOPARDS-BANE.

Plate 24. Fig. 4.

Character of the Species.

Doronicum billidastrum.

The Stalk is leafless, and supports only one Flower.

Fig. 4 *a b.*

BUT that the alternate disposition of Scales in the Cup ascertains the Genus, one could not think this small Plant a *Doronicum*. It is a Perennial, native of the Alps and Pyrenæan mountains; and flowers early in Summer. The Leaves are of a deep green on the upper side, and pale below. The Flower which crowns the simple naked Stalk is perfectly white, only the Disk is yellow.

GENUS

LEOPARDS-BANE

Pl. 24



Generic Character.



Rampant Leopard's Bane.

Spreading Leopard's Bane.



Daisy Leopard's Bane.



Woolly Leopard's Bane.

G E N U S II.

D A I S Y.

B E L L I S.

Character of the Genus.

The Cup rises, and is formed of equal Scales of a lanced shape, and not very numerous.

Plate 25. *o a a.*

I. N A K E D D A I S Y.

Plate 25. Fig. 1. COMMON LITTLE DAISY.

Character of the Species.

Bellis perennis.

The Flower-stalk is naked or destitute of Leaves.

Fig. 1. *a.*

THIS is a Perennial, native of our pastures, and universal almost as the grass which covers them; the common little Daisy. The Leaves are glossy and of a deep green; the Flowerstalk is usually reddish; and the Flower is white, more or less pyed and dappled with a light crimson; and has a yellow Disk.

As humble and simple as this Plant is in our fields, it rises to a great deal, not only of singularity, but beauty, under the garden culture. From the pyed red and white, its colour grows more glowing, the crimson stronger, and diffused more generally; and with this encrease of tinct, there grows also doubleness in various forms; and a new offspring. The Florets of the disk, which are tubular and cut into five Segments, extend themselves on one side in length; two of the Segments grow into one at their edges, and Stretching forward, form, instead of the original tubular Floret, a perfect Ray, like one of those at the verge. Thus is the disk obliterated, and the Flower is full, or double, and composed only of Rays: in the next stage, these Rays filled with abundant nourishment, instead of being plain and flat, rise into bubbles on the surface, or round themselves into quills: and finally, from the base of the Cup there will rise new Stalks, each supporting a small Flower; miniatures of the original from which they rise.

2. LEAFY DAISY.

Plate 25. Fig. 2.

Character of the Species.

Bellis annua.

The Flower-stalk has Leaves upon it.

Fig. 2. *a.*

THIS is an Annual native of the south of France, of Sicily, and Spain. The Stalk is weak and hairy, usually tinged toward the base with red, and of a pale green upwards: The Leaves are also of a faint green, and covered with white hairs: those on the Stalk are paler than such as rise from the root. The Flowers are white, with a yellow disk.

* * WHAT is called the great Daisy is distinguished from this Genus by its Cup; and will be found in its place hereafter. The confusion of names, occasioned by the imperfect observations of earlier Botanists, must not make us bring together differing Plants.

G E N U S III.

S T O N E W O R T.

V E R B E S I N A.

Character of the Genus.

The Cup stands hollowed, and has two ranges of numerous channelled and ascendant equal Scales.

Plate 26. Fig. *a b.*

1. ALTERNATE-LEAV'D STONEWORT.

Plate 26. Fig. 1.

Character of the Species.

Verbesina Chinenfis.

The Leaves are lanced, placed alternate, and have Foot-stalks.

Fig. 1. *a b.*

THIS is an Annual, native of China, and flowers in June. The Stalk is downy, and of a faint green. The Leaves are of a pale green, and lightly hairy. The Flowers stand singly at the tops of the Stalk and principal Branches. Their colour is a delicate yellow. Their Rays are numerous and undivided.

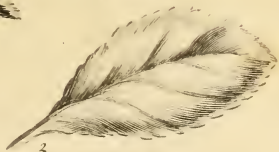
2. C L U S -



Generic Character.



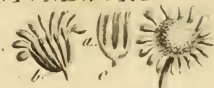
Naked Daisy.



Fleshy Daisy.

STONEWORT

Pl. 26.



Generic Character.



Alternata Stonewort.



Procumbent Stonewort.



Clusters Stonewort.



Woolly Stonewort.



Broad-leaved Stonewort.

Long foot stalk'd Stonewort.

2. CLUSTERY STONEWORT.

Plate 26. Fig. 2.

Character of the Species.

Verbefina Virginica.

The Flowers crown the Stalk in large, broad clusters : the Leaves are lanced.

Fig. 2. *a b.*

THIS also is an Annual, native of the wet grounds in Virginia : and flowers in August. The Stalk is upright, round, and of a yellowish green. The Leaves are of a deep green, and often brown towards the edges. The Flowers are of a delicate pale yellow.

3. PROCUMBENT STONEWORT.

Plate 26. Fig. 3.

Character of the Species.

Verbefina prostrata.

The Stalk leans ; the Leaves are lanced and grow in pairs.

Fig. 3. *a b.*

THIS is an Annual, native of the Indies ; and flowers from June to August. The Stalk is ribbed, and tinged with red. The Leaves are of a bright green. The Flowers are of a strong yellow. They grow upon short Footstalks from the bosoms of the Leaves, usually two together.

4. LONG-FOOTSTALK'D STONEWORT.

Plate 26. Fig. 4.

Character of the Species.

Verbefina Clandulacea.

The Flowers stand singly upon very long Footstalks.

Fig. 4. *a b.*

THIS is an Annual, native of Ceylon, and flowers in July. The Stalk is weak ; the Leaves are of a deep green ; and the Flowers of a perfect gold yellow.

5. WOOLLY STONEWORT.

Plate 26. Fig. 5.

Character of the Species.

Verbefina asteroides.

The Leaves are Woolly, and the Flowers stand singly.

Fig. 5. *a b.*

THIS is an Annual, native of Surinam, and flowers in August. The Stalk is whitish and ribbed. The Leaves stand in pairs, and are white

white and woolly. The Flowers are very beautiful; they resemble some of our finest Asters. The disk is yellow; and the Rays are of a violet blue.

6. WHITE STONEWORT.

Plate 26. Fig. 6.

Character of the Species.

Verbena alba.

The Stalk is robust and erect; the Leaves are lanced and ferrated, and placed in pairs.

Fig. 2. *aa.*

THIS is a Biennial; native of Virginia, and flowers in August. The Leaves are of a good green, and the Stalk is often stained with crimson; but the Flowers are small and white.

* * THERE are other Stoneweeds which have no Rays, and will have their place in the next Class: Vol. II. part 2. The famous *Acemella*, from whose virtues against the Stone, the Genus received its name, is one of the naked kinds:

G E N U S III.

S K Y - F L O W E R.

C O E L E S T I N A.

Character of the Genus.

The Cup spreads itself at top; and is composed of two rows of divergent scales: these are lanced, but terminate in an awly point; and are distinguished by a strong green thick rib in their center.

See Plate 26 ***. Fig. *oooabz.*

OF this Genus there is but one known Species: I have named it from the celestial blue of its Flower, which exceeds that of any other.

I. O V A L -

SKY-FLOWER.

Pl. 26.



a



b

Generic Character.



Oval-leaved Sky-Flower.

I. OVAL-LEAV'D SKY-FLOWER.

Character of the Species.

The Leaves are oval, of a firm substance, and slightly covered with short rigid hairs. The Flowers stand on long naked Footstalks.

Fig. 26^{**}. *ab*.

THIS is a perennial woody Plant, native of the Cape of Good Hope, and flowers throughout the year. It bears the open air with us in summer; and it is then the Flowers shew their true sky tinct. The green-house preserves it very well through Winter, and it flowers all the time, so as to grace the collection extremely, though not in its full lustre.

It grows to about three quarters of a yard high; not perfectly upright, but oblique, and branching extremely, so as to form a very well shaped little bush. Here at Bayswater, I give it the free ground upon a dry hillock all Summer, which it in a manner covers with its spreading shoots. I have counted upon it at one time more than a hundred and eighty Flowers; which, in the midst of a perfectly serene day, have seemed as if they had no colour of their own, but reflected the pure azure of the firmament.

THE Leaves are of a good green; but they get a brownish aspect by the hairs which cover them: the Rays of the Flower turn back when it is fading. The Disk is of a very good yellow.

WE have not had this Plant above seven or eight years in Europe. It has been called a marygold, and an Aster. Those who had a mind to refer it to some known Genus, should have seen that it approached much nearer to the Verbesina: but an attention to the Cup, the most certain, as well as the most obvious source of generic characters, shews what the former uncertainty seemed also to point out, that the Plant is truly of a Genus distinct from all others.

I CANNOT but recommend to those who would see some of the foreign Plants, which are too tender for our winters, in their natural perfection, the method I have mentioned of giving them the full ground all Summer: I use it for the African Geraniums, Othonnas, and a great many other of the Green-house kinds. Little hillocks of fresh earth, of two feet and a half diameter, are ranged in a warm

dry spot, with a south aspect; and one Plant is shook out of its pot, and placed on the summit of the hill; as soon as the danger of cold nights is over. They grow with great freedom, and flower abundantly. They give a great beauty to the garden all Summer; and, though the Winter destroys them, a succession is easily kept up in the usual way from seeds or cuttings.

G E N U S IV.

C H A M Æ M I L E.

A N T H E M I S.

Character of the Genus.

The Cup is hemispheric, and the Scales are linear and nearly equal; they are numerous, and stand compact.

Plate 27. Fig. *a a b*.

a. Those with white Rays.

1. PRICKLY CHAMÆMILE.

Plate 27. Fig. 1.

Character of the Species.

Anthemis cota.

The Disk of the Flower is large and prickly.

Fig. 1. *a b*.

THIS is an annual weed, as troublesome in the corn fields in Italy as the worst of those that plague the English farmers. It is half a yard high. The Stalk is thick and branched. The Leaves are of a blackish green, the Flowers, which blow from May to August, are large and white, but with a yellow Disk. The prickliness of this arises from the Chaffs which separate the Seeds: they have hard pointed tops, and wound the fingers.

2. TALL

CHAMEMILE.

Pl. 27



Generic Character.



Full Chamemile.



Prickly Chamemile.



Sea-side Chamemile.



Wetly Chamemile.

2. TALL CHAMÆMILE.

Plate 27. Fig. 2.

Character of the Species.

Anthemis altissima.

The Plant is erect; the Flowers are large, and the divisions of the Leaves are hard at the ends

Fig. 1. *a b.*

THIS is an annual weed, universal among the corn in the southern parts of Europe, and taller than barley at its highest growth. The Stalk is red, upright, branched and spreading. The Leaves are of a faint green, and the points of their divisions are white and hard, and almost prickly. The Flowers are large and white, and the Chaffs of the Disk have long beards.

3. SEA-SIDE CHAMÆMILE.

Plate 27. Fig. 3.

Character of the Species.

Anthemis maritima.

The Leaves are fleshy and wing'd; and the Leaflets are indented.

Fig. 3. *a a b.*

THE sea-shores of France and Italy are covered often with this spreading Plant, whose innumerable white Flowers seem like snow all Summer. The Stalk is weak and branched: the Leaves are of a faint green: they are winged and indented, and thick and Juicy. It is a Perennial, and propagates abundantly by Root as well as Seeds.

4. WOOLLY CHAMÆMILE.

Plate 27. Fig. 4.

Character of the Species.

Anthemis tomentosa.

The Cups and Footstalks of the Flowers are woolly.

Fig. 4 *a b.*

THIS is a Grecian Sea Plant, perennial, and full of Flowers a great part of the year. The Stalk is weak, and more than a foot long. The Leaves are of a blue green: and the Footstalks of the Flower are long, leafy, and covered with white down.

5. MOT -

5. MOTTLED CHAMÆMILE.

Plate 28. Fig. 5.

Character of the Species.

Anthemis mixta.

The Rays are white but mottled with yellow at the Base :
the Leaves are single but jagged.

Fig. 5. *a a b.*

THIS is an annual weed in the corn fields and vineyards of France and Italy, and principally in those near the Sea ; as also sometimes on the naked sands. The Leaves are of a bluish green. The Plant is not more than a foot and a half high. The Flowers are numerous and large. The Disk is yellow, as in all the other kinds ; but it is singular that in this that part of the Rays which joins the receptacle, and is near the Disk, is also yellow. It flowers in July and August.

6. CHIAN CHAMÆMILE.

Plate 28. Fig. 6.

Character of the Species.

Anthemis Chia.

The Footstalks of the Flowers are leafless but woolly :
the Leaves are pinnated.

Fig. 6. *a b.*

THIS is an Annual ; native of the isle of Chio, and flowers all Summer. The whole Plant scarce rises to a quarter of a yard in highth ; the Stalks divide into many branches, which spread upon the ground ; and are thick covered with deep green Leaves. The Flowers stand singly upon long, slender, woolly Footstalks : these rise erect.

7. SWEET CHAMÆMILE.

Plate 28. Fig. 7. ROMAN CHAMÆMILE.

Character of the Species.

Anthemis nobilis.

The Leaves are subdivided in the winged manner, and
their Segments are narrow, sharp pointed, and lightly
hairy.

Fig. 7. *a l.*

THIS is the long famous, and in a manner universal, Garden Chamæmile ; we have called it Roman, from its supposed peculiar origin in Italy ; but it is also a native of our own country, and of all Europe

CHAMEMILE.

pl. 28

2



Europe and part of Asia. It is a perennial, low Plant; branched extremely, near the ground, and covering it with thick tufts of fresh green, soft, and fragrant Leaves. It flowers from June to October, and the Flowers are white, with a pale yellow Disk.

THIS is the Chamæmile, whose Flowers are, or should be, used in medicine; but as culture easily renders them double, and they look in that state larger and more beautiful, apothecaries chuse such for their shops; ignorant that in the Disk of the Flower, which becomes obliterated in the double state, resides the principal virtue.

8. FIELD CHAMÆMILE.

Plate 28. Fig. 8.

SCENTLESS MAYWEED

Character of the Species.

Anthemis arvensis.

The Stalk spreads into wide Branches, and the Disk rises in a Cone.

Fig. 8. *a b.*

THIS is a weed in our corn fields, and covers the bank fences which divide them. It is a biennial Plant, a foot and half high, with a thick, red Stalk, spreading at top into a multitude of scattered arms; and covered with small white Flowers in a long succession. The Leaves are of a fresh green: they have neither good nor ill scent; and there are speary Chaffs upon the Disk between the Flowers and Seeds.

9. FOETED CHAMÆMILE.

Plate 29. Fig. 9.

STINKING MAYWEED.

Character of the Species.

Anthemis cotula.

The Leaves are recompond in the winged manner: the Stalk is branched and spreading, and the Flowers have a large rising Disk.

Fig. 9. *a a b.*

THIS is an Annual, native of our own waste grounds and dung-hills; and from its early flowering, and its disagreeable scent, has been called Stinking Mayweed: but the English vulgar names are

very equivocal : The common Fumitory is the Mayweed of many counties. The plant is too feet high ; the Leaves are of a dusky Green, and juicy : when bruised they have a rank, ill flavour, The Stalk is round, thick, and green ; and at the top spreads into many branches, on which are numerous large, white Flowers.

I HAVE found that the Flowers of this Plant have the virtues of those of Chamæmile in a superior degree.

10. TRIFID CHAMÆMILE.

Plate 29. Fig. 10.

Character of the Species.

Anthemis Cretica.

The Leaves are variously divided, but the extreme Segments are naturally trifid.

Fig. 10. *a b.*

THIS is an Annual, native of Crete and the other Greek islands ; and flowers from May to August. It is a foot high. The Stalks are weak ; the Leaves spread flat, and are divided into numerous Segments ; but the extreme parts naturally break into threes. The Flowers are placed upon long Footstalks ; and are white, with a yellow, rising Disk :

11. SIMPLE-LEAV'D CHAMÆMILE.

Plate 29. Fig. 10.

Character of the Species.

Anthemis repanda.

The Leaves are oval and undivided, only crenated and nurl'd along the edges.

Fig. 11. *a.*

THIS is a Perennial, native of Spain, and very different from all the rest in its aspect. The Stalk is upright, very little branched, and crowned with several white, slight Flowers with yellow Disks. The Leaves are of a fresh green, and a little downy. It flowers in August.

12. PEL -

CHAMÆMILE.

3

Pl. 29.



Fetid Chamæmille.



Trifid Chamæmille.



Simple-leaved Chamæmille.



Pilatory Chamæmille?

12. PELLITORY CHAMÆMILE.

Plate 29. Fig. 12.

PELLITORY OF SPAIN.

Character of the Species.

Anthemis pyreuthrum dictum.

The Stalk is terminated by a single Flower.

Fig. 1. *a b.*

This is an elegant perennial Plant, native of the East, and of some parts of Europe; common to the island of Crete, and to the hills of Italy, to Syria and Hungary. The Stalk is thick but weak, six or eight Inches high; and in June or July is terminated by a single, large, and very specious Flower. The Rays are snowy white, and as it were enameled on the inside; and of a delicate crimson on the outside. The Leaves are of a fresh but not strong green.

THE Root of this Plant is the Pyrethrum, or Pility of Spain, of the shops.

♂ with yellow Rays.

13. HAIRY CUP'D CHAMÆMILE.

Plate 30. Fig. 13.

Character of the Species.

Anthemis Valentina.

The Divisions of the Leaves are very narrow; and the Cups of the Flowers are hairy.

Fig. 13. *a a.*

THIS is a Biennial, native of France and Spain, and Flowers there from Midsummer to Winter. The Plant is eighteen Inches high. The Stalk is red. The Leaves are of a pale green. The Flowers are altogether yellow, and their Cups, which are hoary, look of a greyish green.

14. TRITERNATE CHAMÆMILE.

Plate 30. Fig. 13.

Character of the Species.

Anthemis Americana.

The Leaves are thrice divided, and each division is by threes: the Flowers have very long Footstalks.

Fig. 1. *a a a.*

THIS is a little Annual, native of the Marshy grounds of Jamaica and Barbadoes; and flowers toward the end of Summer. The Stalk

is

is weak and lies upon the ground. The Leaves resemble in a smaller size those of our common Meadow Crowfoot, but with yet more divisions: their colour is a dusky green. The Flowers are small, and of an orange yellow.

15. SHORT-RAY'D CHAMÆMILE.

Plate 30. Fig. 15.

Character of the Species.

Anthemis mellifolia.

The Rays are very short: the Flowers stand upon extremely long Footstalks.

Fig. 15. *ab.*

THIS is a Siberian, a biennial Plant, flowering in damp, sheltered grounds, toward the end of Summer. The Stalk is two foot long; but leans for some part on the ground. The Leaves are of a pale green and an unpleasant scent. The Footstalks of the Flowers rise from the bosoms of the upper Leaves: they are long, slender, and whitish. The Flowers are of a pale yellow.

16. TWICE-WING'D CHAMÆMILE.

Plate 30. Fig. 16.

Character of the Species.

Anthemis Tinctoria.

The Leaves are winged, and the Leaflets winged again; and they are woolly on the under side.

Fig. 16. *ab.*

THIS is a perennial spreading Plant of two feet high, native of the German open fields; and it flowers most part of the Summer. The Stalk is often crimson. The Flowers are naturally yellow; but sometimes their Rays are white, except at the Base. This has occasioned some mistake, the Plant in that state having been considered as distinct: but it is the same.

17. BRANCHING-CUPP'D CHAMÆMILE.

Plate 30. Fig. 17.

Character of the Species.

Anthemis Arabica.

The Flower-cups branch out into threes.

Fig. 17 *ab.*

THIS is an Annual, native of Arabia, and flowers the greatest part of the year. The Stalk is weak, but half a yard in height. The Leaves

CHAMEMILE.

No. 30.

4





Leaves are sunburnt and tawny. The Flowers are moderately large and yellow; three or four always crown the shoot, two or three rising from the Cup of the original Flower.

G E N U S V.

M A Y W E E D.

C O T U L A.

Character of the Genus.

The Cup has two rows of broad equal expanded Scales, longer than the rays of the Flower.

Plate 31. Fig. *a a b*.

1. D O W N Y M A Y W E E D.

Plate 31. Fig. 1.

Character of the Species.

Fig. 4. *Cotula Turbinata*

The Leaves are downy and deeply divided into narrow Segments.

Fig. 1. *a b*

THIS is an Annual; a low, but very singular little Plant, native of the Cape of Good Hope; the great country for botanic singularities: but it will bear the open air with us, and Ripen Seeds upon our exposed borders. The Stalks are weak; the Leaves are woolly; the Flowers are white, with a yellow Disk; but the most singular part about them, is a large blue-green Cup, exceeding the Petals in extent. The receptacle naturally swells at its Base, and gives the Bud of the Flower a peculiar form before it opens; sometimes also this turbinated shape continues through the whole time of flowering; but where the Plant is native, the Cup expands in this as well as the other *Cotulas*; and it is the same where it thrives in our gardens. It flowers in June.

2. CLAMMY MAYWEED.

Plate 31. Fig. 2.

Character of the Species.

Cotula viscosa.

The Leaves are smooth and clammy ; they are pinnatifid, and the extreme Lobe is large.

Fig. 2. *a b.*

THIS is an Annual, native of Vera Cruz, with very little beauty, but enough of singularity to recommend it. It flowers in August. The Stalks are weak, and lie upon the ground : the Leaves stick to the hand, which touches them ; the petty Flowers are white, as in the other ; but they are yet more over-shadowed by their great green Cup. The Seeds often fail of ripening here.

* * THERE are two other Species of this Genus, but they have naked Flowers, a yellow Disk, without Rays. Our succeeding Class comprehends the naked Kinds ; and, as in all similar instances, this Genus will be repeated there to give those Species.

G E N U S VI.

M A R Y G O L D.

C A L E N D U L A.

Character of the Genus.

The Cup is hollowed, and its Scales are numerous, lanced, sharp-pointed, equal and set thick.

Plate 32. Fig. *o a a.*

1. ORANGE MARYGOLD.

Plate 32. Fig. 1. COMMON MARYGOLD.

Character of the Species.

Calendula Officinalis.

The Leaves are lanced, obtuse, and undivided.

Fig. 1. *a b.*

THIS is an Annual ; native of the South of Europe ; the Common Marygold of our gardens : it flowers in Autumn. Culture makes it double and proliferous ; and the Colour also varies, but the Plant is the same.

2. SMALL-



Generic Character.



Downy May-weed.



Clammy May-weed





2. SMALL FLOWERED MARYGOLD.

Plate 32. Fig. 2.

Character of the Species.

Calendula Hybrida.

The Leaves are pinnatifid, and the Stalks are leafy, and thickened at the top.

Fig. 2. *a b.*

This is a biennial, native of the Cape of Good Hope; an humble pretty Plant: It flowers in August; bearing the open air with us. The Flowers are crimson on the back, and white within.

3. NAKED STALKED MARYGOLD.

Plate 32. Fig. 3.

Character of the Species.

Calendula Nudicaulis.

The Stalk is wholly destitute of Leaves.

Fig. 3. *a.*

This is also a native of the Cape; but bears the air with us, and flowers in August; the Flower is very large, and violet-coloured on the outside, but white within.

4. ÆTHIOPIAN MARYGOLD.

Plate 32. Fig. 4.

CAPE MARYGOLD.

Character of the Species.

Calendula Pluvialis.

The Leaves are lanced, and deeply indented, and the Stalk is leafy.

Fig. 4. *a b.*

This is an Annual also; and, though a native of warm regions, flowers in the open air with us in July and August. The Plant is weak and unsightly; but the Flowers make amends: their back is a fine crimson.

5. GRASSY-LEAVED. MARYGOLD.

Plate 32. Fig. 5.

Character of the Species.

Calendula graminifolia.

The Stalk is almost naked; the Leaves are linear, and undivided.

Fig. 5. *a b.*

This is an elegant Plant; native of the same part of the world with the former: but more valuable, as it is a Perennial, and flowers from

from May to August. The Flower is delicately crimson on the back, and white within : the Leaves are of a fresh green, and rise in great Tufts.

G E N U S VII.

DWARF SUNFLOWER.

RUDBECKIA.

Character of the Genus.

The Cups turn back ; it has two rows of oblong, obtuse, similar leafy Scales ; and the Disk of the Flower rises high.

Plate 33, Fig. *o a a*.

1. HARSH DWARF SUNFLOWER.

Plate 33, Fig. 1.

Character of the Genus.

Rudbeckia hirta.

The Leaves are equal, and covered with stiff hairs : The Rays are nip'd away at the End.

Fig. 1. *ab*.

THIS is a Perennial ; native of Virginia, and lives freely in the open Ground with us, flowering from August to October. The Flowers also are very lasting. It is a Foot and a half high. The Leaves are dusky ; the Rays yellow, and the high Disk purple.

2. PAIRED-LEAVED DWARF SUNFLOWER.

Plate 33, Fig. 2.

Character of the Species.

Rudbeckia oppositifolia.

The Leaves are oval-lanced : The Rays are split deep in two at the End.

Fig. 2. *ab*.

This is a Perennial ; native of Virginia, and bears the open Air with us. The Plant is two foot high : the Leaves are smooth ; the Flowers are yellow with a purple Disk. The Cup is shorter than in all other Species. It flowers in August.

3. CRIM-

DWARF, SUN-FLOWER.

1873.



Three Lobed Pursue, Sun flower. Lacinated Pursue, Sun flower.

CRIMSON DWARF SUNFLOWER.

Plate 33. Fig. 3.

Character of the Species.

Rudbeckia Purpurea.

The Leaves are oval, but swell in the middle and stand alternate. The Rays are split.

Fig. 3. *a b*

THIS is a Perennial; native of Carolina and Virginia, and flowers in August. It grows with us in open Ground; but is not easily increased: the Seeds not ripening well, and the Root putting out few new heads. It is two feet and a half high. The Rays are pale crimson, and the rising Disk is purple with a Glow of green and gold: such as we see upon the wings of certain beetles.

4. THREE-LOBED DWARF SUNFLOWER.

Plate 33 Fig. 4.

Character of the Species.

Rudbeckia Triloba.

The lower Leaves are cut into three distinct parts; those toward the top entire.

Fig. 4. *a b*.

THIS is a Biennial; native of Virginia, and lives freely in our Borders. It flowers in August, and the Seed ripens with us. It is two feet high, and bears many Flowers.

5. LACINIATED DWARF SUNFLOWER.

Plate 33. Fig. 5.

Character of the Species.

Rudbeckia laciniata.

The Leaves are cut and split into many long irregular Divisions.

Fig. 5. *a*.

THIS is a Perennial, native of Virginia: a plant of five feet high; flowering all the latter part of Summer. The Disk as well as Rays is yellow.

G E N U S VIII.

T I C K - S E E D .

C O R E O P S I S .

Character of the Genus.

The Cup has two rows of distant and dissimilar Scales rising from a fleshy Base.

Plate 34. Fig. o. *ab*.

1. CLUSTER-LEAVED TICK-SEED.

Plate 34. Fig. 1.

Character of the Species.

Coreopsis Verticillata.

The Leaves are divided into oblong narrow Segments, and surround the Stalk.

Fig. 1. *ab*.

THIS is a Perennial ; native of Virginia ; a Plant of four feet high, and Flowers in August : the Leaves are placed in pairs ; but their Divisions seem to surround the Stalk in Circles, as in the Verticillate Plants. The Flowers are of a delicate yellow, with a purple Disk ; very numerous, and very beautiful.

2. TERNATE-LEAVED TICK-SEED.

Plate 34. Fig. 2.

Character of the Species.

Coreopsis Tripteris.

The lower Leaves are cut to the Base into three distinct and entire divisions.

Fig. 2. *a*.

THIS is a Perennial ; a tall, robust Plant of six feet high, covered with golden Flowers from July to October : It is a native of North-America, and lives with us freely in the open Air. The Leaves are of a deep green, and the Stalk is extremely branched toward the Top. Though the lower Leaves are composed of three distinct Parts, the upper ones are entire.

TICK-SEED

Pl. 34



Generic Character.



Cluster leav'd
Tickseed.



Femate-leav'd Tickseed.



White Tickseed?



Auriculated Tickseed.



3. WHITE TICK-SEED.

Plate 34. Fig. 3.

Character of the Species.

Coreopsis Alba.

The Leaves are formed of three distinct Parts, which are short and serrated.

Fig. 3. *a b.*

THIS is a Perennial; native of Santa-Cruz, an humble and a very singular Plant. The Stalks divide into many Branches. The Leaves are deeply serrated, and of a bluish green. The Flowers are white: they consist of a few broad Rays, and have a glow of crimson toward the Center. It flowers toward the latter end of August.

5. AURICULATED TICK-SEED.

Plate 34. Fig. 4.

Character of the Species.

Coreopsis Auriculata.

The Leaves have an Appendage, or Ear, on each side of their Base.

Fig. 4. *a a.*

THIS is a Biennial; native of Virginia; a Plant of two feet high; divided into many Branches, and covered with fine gold yellow Flowers, from July to September. The upper Leaves are simple: those lower down the Stalk have a pair of Ears at the Base, and in the lowest of all, these are so large, that they appear trifoliate.

5. LINEAR TICK-SEED.

Plate 35. Fig. 5.

Character of the Species.

Coreopsis angustifolia.

The Leaves are simple, narrow, undivided, and all the way of a breadth.

Fig. 5. *a a.*

THIS is a Perennial, native of Virginia; and bears our open Air freely, if kept in a Place not too wet. The Stalks are usually tinged with brown. They are slender, and less branched than the other kinds;

kinds; the Leaves also have, with their natural dusky green, some tinge of brown: the Flowers are numerous, and of a bright yellow. They blow in August.

6. LANCED TICK-SEED.

Plate 35. Fig. 6.

Character of the Species.

Coreopsis Lanceolata.

The Leaves are simple, undivided at the edge, oblong, and swelling in the middle.

Fig. 6 a b.

THIS is a native of Carolina, a very singular and beautiful Plant, with large golden Flowers, and the inner series of Scales on the Cup so highly coloured, that they seem Rays, tho' short; and give an air of doubleness. Most Authors have joined it with the *Bidens*; but the Cup in that Genus is simple: in this the double range is so conspicuous, that it gave origin to the generic distinction, and it was the first species called by the name *Coreopsis*. The Leaves are of a delicate, though simple shape; their colour is a strong green. The Flowers appear in July.

7. CONNATE TICK-SEED.

Plate 35. Fig. 7.

Character of the Species.

Coreopsis Bidens

The Leaves grow together at their bases, and the Stalk runs thro' them.

Fig. 7. a a b.

THIS is a native of the northern parts of Europe, an Annual; which flowers by the sides of Ponds all Autumn. It is the more singular, because all the rest are American; and it has been confounded with the drooping *Bidens*: but the double row of Scales in the Cup separates it not only from that Species, but from the whole Genus. It is four feet high; the Leaves are of a fresh green, and the Flowers stand erect, and have long Footstalks.

8. DE *

TICK SEED.

Pl. 35.



Linear Tick-seed.

Lance'd Tick-seed?



Connate Tick-seed.

Decurrent Tick-seed.

8. DECURRENT TICK-SEED.

Plate 35. Fig. 8.

Character of the Species

Coreopsis alternifolia.

The Leaves are lanced, serrated, and run down the Stalk.

THIS is a native of Virginia, a Perennial; ten feet high, and flowers late in Autumn. The Leaves are harsh to the touch, and the Flowers are pale yellow.

G E N U S IX.

H E A R T - S E E D .

S I L P H I U M .

Character of the Genus.

The Cup has two rows of dissimilar Scales, the outer row leafy.

Plate 36. Fig. *o a a*.

1. HELIANTHOIDE HEART-SEED.

Plate 36. Fig. 1.

Character of the Species.

Silphium helianthoides.

The Leaves grow in pairs on Foot-stalks: they are oblong-oval, and serrated.

THIS is a Perennial, native of Virginia: a very tall and elegant Plant. The Stalk is six feet high; the Leaves are naturally of a faint green, and usually variegated with blotches of yellow. The Flowers are large and of a deep strong yellow. They blow from August to November: and from time to time taller Footstalks rise beyond the original Flower.

2. LACINIATED HEART-SEED.

Plate 36. Fig. 2.

Character of the Species.

Silphium laciniatum.

The Leaves are cut into deep segments in the pinnatifid manner.

Fig. 5. *a b*.

THIS is a Perennial, native of North America, and a wonderful stately as well as singular Plant. It is ten feet high. The Leaves

are of a faint green, and the Flowers of a glorious yellow. It flowers from August to October.

3. TRIFOLIATE HEART-SEED.

Plate 36. Fig. 3.

Character of the Species.

Silphium trifoliatum.

Three rough Leaves grow naturally at each joint, sometimes four.

Fig. 1. *ab.*

THIS is a Perennial, native of Virginia; a plant long known in our gardens, flowering all August and September. The Stalk is firm and branched; the Leaves are of a dusky green; the Flowers are delicately yellow.

4. LANCED-LEAVED HEART-SEED.

Plate 36. Fig. 4.

Character of the Species.

Silphium foliaginoides.

The Leaves are lanced and ferrated: they have Footstalks and grow in pairs.

Fig. 4. *ab.*

THIS is like the former, a Perennial, native of Virginia; a very fine Plant, flowering all Autumn: the Stalk is firm and variegated, the Leaves are of a fine fresh green, and the Flowers of a bright yellow.

5. ENTIRE-LEAVED HEART-SEED.

Plate 36. Fig. 5.

Character of the Species.

Silphium asteriscus.

The Leaves grow in pairs, without Footstalks, and have no indentings.

Fig 5. *ab.*

THIS is a Perennial, native of Virginia; a very beautiful and robust Plant. The Leaves are of an extremely fine deep green; the Flowers

HEART-SEED.

Pl. 36.



Generic Character.



Lanceol-leav'd Heart-seed.



Entire leav'd Heart seed?



Helianthoid Heart-seed.



Lacinated Heart-seed.



Trifoliate Heart-seed.

Flowers are very large and yellow; they have greatly the aspect of some of the smaller Sunflowers. The Stalks add to the beauty; for they are spotted elegantly with a deep crimfon.

G E N U S X.

T W I N - W E E D .

G E M E L L A .

Character of the Genus.

The Cup has two rows of dissimilar Scales, rising as twins, near each other, and from one fleshy Base.

The Rays of the Flower are five,

Plate 36** Fig. *o a b c*.

Of this Genus there is but one known Species; a tall, upright, and, if not an elegant, at least a most singular Plant.

W I N G E D T W I N - W E E D .

Character of the Species.

The Leaves are winged.

Plate 36 ** *a b*.

THIS is an Annual, native of damp ground in Pensylvania, and other parts of North-America; and flowers with us in August. The Plant is two feet and a half high: it has an erect firm Stalk, with thick joints, and deep furrows; naturally of a faint green, but usually sunburnt: and thence tinged red or brown. The Leaves are placed opposite; each is composed of two or three pairs of Leaflets with an odd one at the end: these are of a fresh green, smooth and bright, and have the Footstalk edged. The Flowers are numerous but small: they crown the tops of the Stalk and Branches in an irregular manner; and consist each of a yellow Disk, and five white Rays. The Seeds stand first erect, in a kind of cylindric column; but afterwards, as they dry and harden, they diverge and form a loose round ball. Their continuance in the columnar form is so long, and their spreading afterwards is so uncertain, that they shew in an

illight that distinction which has been established in a Genus somewhat allied to this, from the erect position, or the divergence of the Seeds.

This new Genus will prove of great use in the formation of a NATURAL METHOD; the lamented Desideratum in Botany, and the great end and aim of our present undertaking.

IN that method, the progress of which keeps constant, though not equal, pace with this our artificial Index, we shall, so far as our limited Faculties may be capable, and the due humility of our nature may devoutly authorize, endeavour to enter into the idea of the great Creator when he made the multitude of Plants; and to arrange them in the course wherein they follow one another, according to the order of their formation.

IN this method, so far as our feeble powers and imperfect knowledge may enable us to proceed, we shall find the Genera of Plants following one another in a true regularity; not as imaginary or arbitrary marks distinguish them, but as the several kinds rise above each other by some additional part, or new organization: and between each, to fill the imagined gap, for nature makes none real between Genus and Genus, we shall always find either by newly discovered Species, or by a better observation of the old, some Plant which partakes as it were of the nature and characters of both; standing upon the confines of either territory, and leading, without disunion from one to the other.

ONE of these FRONTIER PLANTS is our *Gemella*: and it may not be amiss to give a sketch of what is purposed to be done hereafter throughout all Vegetable Nature in the present instance.

WE knew before, I. a Genus *BIDENS*, whose Cup is formed of a *single row* of Scales, under which there stands a *Circlet of leafy films*. II. A Genus *COREOPSIS* in which the Cup has two rows of *distant* Scales, from a fleshy Base, the outer somewhat leafy. and III. A Genus *SILPHIUM*, in which the two-row'd Cup loses in great part its fleshy Base, and the outer row of Scales is perfectly leafy. Now it is evident that the gradation from the second to the third of these is natural and easy; but it had not appeared before that there was any connection between these two and the first, whose Cup is truly simple. Here we have the Frontier Plant between the *Bidens* and the *Coreopsis*;

TWIN-WEED

Pl. 36.



Generic Character.



Winged Twin-Weed?

Coreopsis; and we may learn from it the chain of nature. Our Gemella has the Circlet of leafy films of the Bidens raised into a part and portion of the Cup: it shews therefore what that kind of Circlet is in nature; namely the first advance from a more simple toward a more complex Cup. The Cup of Bidens is therefore the extreme, or last of the simple Cups, and that of Coreopsis the first of the double ones. This GEMELLA is the second advance; or the Plant between them. In the order of original nature it stands there, and there it will have its place in our succeeding natural method; in which there will be no distinction of separate or broken Parts, under different arrangements, but the course will run on thus;

- I. BIDENS, having a Circlet, placed beneath the Scales of its simple Cup.
- II. GEMELLA, having the Circlet twinborn, and connected with the inner Scales of the Cup; only making an outer range.
- III. COREOPSIS, having the outer range distant and spreading.
- IV. SILPHIUM, having the outer range distant and Leafy.

THIS is the order of nature in respect of these four genera, and by this will be brought together Plants which no artificial character connects, tho' they are really allied so closely.

OUR third and fourth *Attractylis*, and the two *Carpesia* in the following Plates, afford like instances; connecting what are called, in artificial methods, different classes; but it is not yet a time to speak of them.

END of Vol. II. Part I.

